Railway Age Gazette

SECOND HALF OF 1917—No. 6 SIXTY-SECOND YEAR

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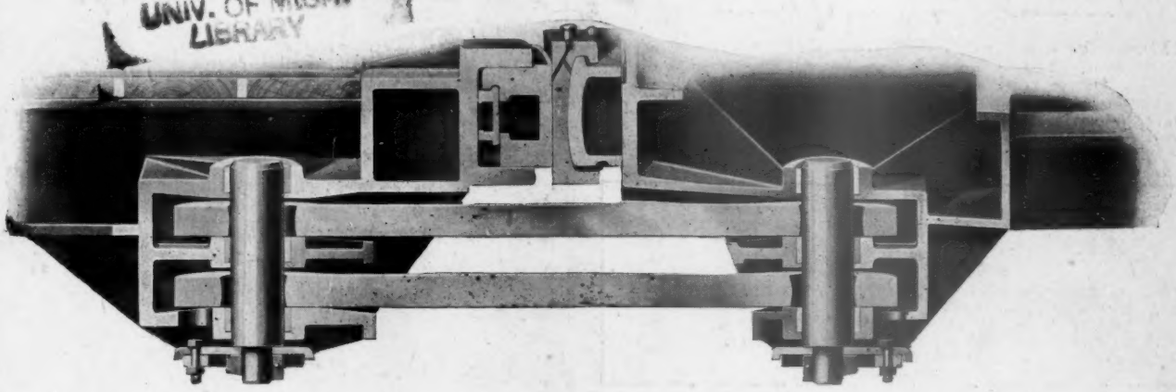

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An American Railroad in France

An idea of the magnitude of the operations to be undertaken by the American forces in France is to be gained from the recent government purchase of 150,000 tons of 80-lb. rails for use overseas. This is equivalent to 600 miles of double track line, and will make up the principal part of the railway to be constructed from the French port to the portion of the battle front to be occupied by the American troops, together with terminal developments, sidings, etc., which will be required to take care of the war traffic. With this order for rails were others for angle bars, track bolts, etc. Still others must be made for the switches and other material necessary to make the complete railroad. There is nothing essentially novel about the shipment of this material to France, since large quantities of all manner of American railway materials and equipment have been finding their way to that country during the last three years. The distinction as to this material, however, is that it will become a part of an American railroad built and maintained by Americans and operated by them with American equipment. What better opportunities have ever been afforded the American manufacturers to demonstrate the merits of their products? It is true that the service will be severe and that maintenance will be reduced to the very minimum that can be permitted without impairing the efficiency of operation, but this disadvantage is more than offset by the fact that the entire road will be in the hands of men thoroughly familiar with the standards of track and rolling stock which they are to handle. French railway men will have an opportunity to compare English and American railway materials and methods under French conditions, and American standards should not suffer by the comparison.

Victory for Railways in Yardmen's Strike

The controversy between yardmen in the Chicago district belonging to the Brotherhood of Railroad Trainmen and 19 railways having terminals in Chicago, which resulted in a strike from July 28 to July 30, was finally settled by an agreement reached on August 1. The developments previous to and during the strike, together with the intervention of representatives of the other railway brotherhoods, were covered in the *Railway Age Gazette* for August 3, page 198. The settlement was a complete victory for the railroads. The controversy arose over three demands made by the Brotherhood of Railroad Trainmen. One of these related to the reinstatement of employees who have left the service of the companies, and another to the employment of new men. Both of these demands of the Brotherhood of Railroad Trainmen were formally withdrawn. The other of the three main points in controversy related to the appointment of yardmasters and assistant yardmasters. The Brotherhood of Railroad Trainmen demanded a rule providing that "in the employment of yardmasters and assistant yardmasters the senior qualified yardmen shall be given preference." The Managers' Conference Committee offered a rule providing that "in the employment of yardmasters and assistant yardmasters the senior yardmen will in all cases be given full and unprejudiced consideration." The rule proposed by the Managers' Conference Committee was accepted in the final agreement. In other words, the Brotherhood of Railroad Trainmen withdrew two of the demands which it struck to enforce and accepted the proposal made before the strike by the railways for the settlement of the third point in controversy. The Brotherhood of Railroad Trainmen ordered the strike in Chicago without any substantial cause or justification, and within a few hours after the strike began it was evident that it was lost. The brotherhood gained nothing by its action but an increase of public disfavor.

The "Peanut" Privilege

"Do you know, it gets my goat the way the public everlastingly slams the railroads for the discourtesy and ill-treatment patrons often get at some of the station news-stands, soda fountains and candy counters; and the funny part of it is that the railroads don't run these things at all." But, then, is it so strange? How can any one legitimately expect the average traveler to understand that these stands are not run by the stationmaster, but by concessionaires? They all look alike to him, ticket agents, red-caps, trainmen, train "butchers," and clerks at the candy counters. He has neither time to notice that the clerks wear some name other than the railroad's on their hats, nor does he care. If he receives discourteous treatment he naturally blames it on the railroad; and there goes another potential bit of friendship for the road. The way some of the concessionaires let their em-

ployees treat the public would almost make one think that they were working the peanut privilege at the old-time circus. To be sure, they do not sell bad goods, nor do they give short weight or change, but they do too often act as if it were a case of here today and gone tomorrow; or, in other words, as if courtesy did not count. The railroad must hold itself directly responsible for any ill-feeling this may engender on the part of its patrons. If the owners of the concessions do not realize that plain ordinary courtesy is the best selling argument ever invented, the railway must be just that more insistent. Constant inspection by the stationmaster and insistent jacking-up will do it. Courtesy at the news-stand, at the ticket window and on the train is all the same and always the best producer of good-will on the part of the public; and in these days of threatening war-time stress and strain on the transportation facilities, no railway can take any chances with the good will of the public. Fortunate are those railways in whose stations the concessions make courtesy the most emphasized point of service.

ALL RAILWAY RECORDS BEING BROKEN

ALL previous records of American railways for volume of traffic moved, for earnings made, for expenses incurred and for taxes paid are rapidly being broken. This is shown by statistics of the Class I roads for the five months January to May, inclusive, of the present year, and especially for the month of May, the statistics for which only recently became available. In the five months January to May, 1917, Class I roads—those earning over $1,000,000 gross each—earned a total of $1,548,348,314. This was an increase of $156,000,000, or 11.2 per cent over the same months of 1916; an increase of $348,000,000, or 29 per cent, over the same months in 1913 and an increase of 48.7 per cent over the same months of 1911. Their operating expenses were $1,118,300,000, an increase of $171,400,000, or 18 per cent over the same months of 1916, and of $232,000,000, or 26 per cent, over the same months of 1913. The increase in total earnings over the same months in 1911 was 48.7 per cent and in operating expenses 49.7 per cent.

TABLE I—RELATION OF OPERATING EXPENSES AND TAXES TO OPERATING REVENUE FOR THE FIRST FIVE MONTHS OF CALENDAR YEARS 1911 TO 1917—CLASS I ROADS

	Operating revenue	Operating expenses	Taxes	Operating income	Per cent taxes to op. revenue	Per cent op. income to op. revenue
1917....	$1,548,348,314	$1,118,273,075	$71,781,362	$357,942,675	4.63	23.11
1916....	1,392,204,458	946,856,667	61,807,317	383,452,304	4.44	27.55
1915....	1,119,782,397	816,264,700	55,793,316	247,469,337	4.91	22.09
1914....	1,135,575,133	864,241,338	57,144,848	212,355,639	5.03	18.70
1913....	1,200,112,304	886,948,276	51,822,504	260,337,563	4.32	21.69
1912....	1,085,142,142	797,375,850	48,256,172	238,354,947	4.45	21.97
1911....	1,041,989,371	746,989,146	43,267,596	251,155,703	4.15	24.10
Increase 1917 over 1911, per cent...	48.7	49.7	65.9	42.5		
Increase 1917 over 1913, per cent...	29.0	26.1	38.5	37.5		
Increase 1917 over 1916, per cent...	11.2	18.1	16.1	— 6.6		

Among the largest increases of all is in taxes. In the first five months of 1917 they amounted to $71,781,362. This was an increase of $9,900,000, or 16 per cent, over the same months of 1916; an increase of 38½ per cent over the same months of 1913, and an increase of 66 per cent over the same months of 1911.

While the increase in total earnings over 1916 was $156,000,000, the increase in operating expenses and taxes together was $181,650,000. In consequence, for handling $156,000,000 more business the railways in these months received $25,900,000 less net operating income. As compared with 1913, however, net operating income showed an increase of 37½ per cent and as compared with 1911 an increase of 42½ per cent.

The proportion of total earnings required to pay operating expenses and taxes shows a sharp increase. In the first five months of 1911 it took 76 cents out of each dollar of earnings to pay operating expenses and taxes. In those months of 1913 this increased to 78 cents, and in 1914 it increased to the record-breaking figure of 81 cents. In 1916 it dropped to 72½ cents, but in 1917 it increased to 77 cents. While, therefore, net operating income has thus far been larger than in any previous year except 1916, the increases in operating expenses and taxes have been so great that net operating income has become relatively a much smaller part of the total amount earned.

The bulk of the increase in total earnings is being derived, of course, from the handling of freight. Freight earnings in the first five months of the year were over $97,000,000 greater than they were in the same months of 1916, an increase of 9.7 per cent, and about $160,000,000 greater than they were in the same months of 1913, the record year before 1916, an increase of 30.4 per cent.

TABLE II—COMPARISON OF OPERATING REVENUES, FREIGHT REVENUES, TAXES AND OPERATING INCOME FOR THE FIRST FIVE MONTHS OF THE CALENDAR YEARS 1917, 1916 AND 1913—EASTERN, WESTERN AND SOUTHERN DISTRICTS

	United States	Eastern District	Southern District	Western District
	Freight Revenue			
1917.....	$1,104,928,239	$490,569,895	$174,566,134	$439,792,210
1916.....	1,007,673,593	463,467,591	158,442,814	385,763,188
1913.....	847,431,978	385,772,635	137,460,256	324,199,087
Increase 1917 over 1916, per cent...	9.7	5.8	10.2	14.0
Increase 1917 over 1913, per cent...	30.4	27.2	27.0	35.6
	Operating Revenue			
1917.....	$1,548,348,314	$692,997,424	$237,874,785	$617,476,105
1916.....	1,392,204,458	642,258,225	212,082,555	537,863,678
1913.....	1,200,112,304	536,272,481	190,183,798	473,656,025
Increase 1917 over 1916, per cent...	11.2	7.9	12.2	14.8
Increase 1917 over 1913, per cent...	29.0	29.2	25.1	30.4
	Taxes			
1917.....	$71,781,362	$28,959,455	$11,438,455	$31,483,452
1916.....	61,807,317	25,196,551	8,904,743	27,706,023
1913.....	51,822,504	22,367,732	7,005,555	22,449,217
Increase 1917 over 1916, per cent...	16.1	14.9	28.5	13.6
Increase 1917 over 1913, per cent...	38.5	29.5	63.3	40.2
	Operating Income			
1917.....	$357,942,675	$130,898,489	$65,510,909	$161,533,277
1916.....	383,252,304	175,010,810	63,838,593	147,402,901
1913.....	260,337,563	105,064,221	43,963,114	111,310,228
Increase 1917 over 1916, per cent...	— 6.6	— 25.2	2.6	9.6
Increase 1917 over 1913, per cent...	37.5	24.6	26.2	45.1

The month of May was a record-breaker in numerous ways. The total earnings of $345,773,079 were greater than those ever made in a single month before in the history of American railways. The record was previously held by October, 1916, but earnings in May were $7,470,000 greater than in October, 1916. The operating expenses incurred in May also broke all previous records for a single month. They amounted to $238,682,000, which was about $9,500,000 more than they were last March, in which they reached the previous high record. It is a notable fact, however, that while both operating revenues and operating expenses broke all records in May, the record for net operating income was very far from broken. Net operating income in May was $92,079,000. There were five individual months in 1916, three in 1915 and one in 1912 when it exceeded this amount. In October, 1916, with total earnings $7,400,000 less than in May, 1917, the railways had net operating income $22,000,000 greater than in May. These figures show in a striking manner how much faster, relatively, increases in operating expenses and taxes have been occurring than increases in total earnings. Reports to the Railroads' War Board show that in May, 1917, railways having 173,105 miles of line handled 29,522,870,109 ton-miles of freight, or 16 per cent more than in May, 1916. This undoubtedly is the largest freight traffic ever carried.

The railways of the three large territories, East, West and South, have benefited in widely differing degrees by the increases in total earnings. The eastern lines had an increase of $50,700,000, or 7.9 per cent in total earnings, in the first five months of 1917 as compared with the same months of 1916, but the increases in their operating expenses and taxes were so large that their net operating income declined $44,200,000, or 25 per cent. The southern lines, with an increase of 12.2 per cent in total earnings, had an increase of 2.6 per cent in net operating income, and the western lines with an increase of 14.8 per cent in total earnings had an increase of 9.6 per cent in net operating income.

Any presentation of the facts about the increases in railway earnings, operating expenses, taxes and net operating income which did not include some analysis of the increases in operating expenses would be incomplete. It is a truism of railway economics that a railway on which maintenance expenses are large compared with transportation expenses probably is in a healthy condition, while one on which transportation expenses are large compared with maintenance expenses probably is not in a healthy condition. Within the last eighteen months, and especially within the last year, there have been large advances in the wages of labor and also in the prices of all materials and supplies used in operation and maintenance. These advances in wages and prices of materials and supplies would, other things being equal, affect the expenses of all the branches of the operating department — transportation, maintenance of way and maintenance of equipment. The figures show, however, that the increases in transportation expenses have been relatively much larger than those for maintenance of way and of equipment.

TABLE III—RELATION OF TRANSPORTATION EXPENSES TO TOTAL OPERATING EXPENSES FOR THE FIRST FIVE MONTHS OF CALENDAR YEARS 1911 TO 1916—CLASS I ROADS

Transportation Expenses

	United States	Per cent of total	East	Per cent of total	South	Per cent of total	West	Per cent of total
1917	$594,395,568	53.2	$295,586,238	55.5	$79,107,114	49.1	$219,702,216	51.8
1916	474,320,522	50.9	231,892,267	52.1	64,300,755	46.3	178,127,500	49.1
1915	413,368,227	50.6	192,513,168	51.3	60,241,350	48.4	160,613,709	50.8
1914	444,102,289	51.4	207,687,987	52.4	68,781,363	48.8	167,632,939	51.2
1913	456,011,558	51.4	211,974,537	52.0	68,164,789	48.9	175,872,232	51.7
1912	427,780,318	53.4	199,026,516	54.1	62,050,991	49.7	164,702,811	54.0
1911	394,669,107	52.8	193,911,065	53.8	48,098,998	48.9	152,659,044	52.6
Increase 1917 over 1911, per cent	50.6		52.4		64.6		43.9	
Increase 1917 over 1913, per cent	30.3		39.4		16.1		24.9	
Increase 1917 over 1916, per cent	25:3		27.4		23.0		23.4	

In fact, the increases in transportation expenses during the present year thus far have been so great as to be alarming. While the increase in total earnings in five months of 1917 over 1916 was 11 per cent and the increase in total operating expenses was 18 per cent, the increase in transportation expenses was $120,075,000, or 25 per cent. The importance and ominousness of this increase becomes more apparent when it is realized that it has taken place in spite of unusual increases in the average trainload and the average carload. It reflects chiefly, first, the advance in the wages of train service employees due to the Adamson law, and second, the large advances which have occurred in the prices of fuel. The increase in expenditures for maintenance of equipment over 1916 was 12 per cent and the increase in expenditures for maintenance of way, 8 per cent. The same general tendency is shown when comparison is made between the first five months of 1913 and the first five months of 1917, the increase in the cost of conducting transportation being 30.3 per cent; that of maintenance of equipment, 27.6 per cent and that of maintenance of way 9.3 per cent.

The result has been a substantial increase in the ratio of transportation expenses to total operating expenses. In the first five months of 1913 transportation expenses were 51.4 per cent of total operating expenses; in the same months of 1916, 50.9 per cent; and in the same months of 1917, 53.2 per cent. In these months of 1913, maintenance of equipment expenses were 23.9 per cent of total operating expenses; in 1916, 25.5 per cent, and in 1917, 24.2 per cent. In the first five months of 1913, maintenance of way expenditures were 18.3 per cent of the total; in 1916, 17.4 per cent; in 1917 only 15.9 per cent.

The largest increase in transportation expenses relatively to maintenance expenses has occurred on the Eastern lines both between 1913 and 1917 and between 1916 and 1917. But while the eastern lines have been in every way the hardest hit by advancing expenses, the general tendency has been the same throughout the country. In other words, the general tendency has been for operating expenses to increase faster in proportion than total earnings, for cost of conducting transportation to increase faster than expenditures for maintenance and for taxes to increase fastest of all. The expenditures for maintenance of way have shown an especially small increase relatively.

The foregoing facts must be left to speak for themselves. While they show that the railways are handling the largest business that they ever did, it cannot be said that the general conditions under which they are handling it are satisfactory. In the course of time the advances in rates that the Interstate Commerce Commission has granted to the eastern lines and

TABLE IV—RELATION OF MAINTENANCE EXPENSES TO TOTAL OPERATING EXPENSES FOR THE FIRST FIVE MONTHS OF THE CALENDAR YEARS 1911 TO 1917—CLASS I ROADS

United States

	Maintenance of way	Per cent of operating expenses	Maintenance of equipment	Per cent of operating expenses
1917	$177,319,957	15.9	$270,762,754	24.2
1916	164,545,842	17.4	241,081,982	25.5
1915	138,865,835	17.0	201,745,373	24.7
1914	150,858,470	17.4	210,960,834	24.4
1913	162,272,938	18.3	212,132,018	23.9
1912	132,802,787	16.7	185,172,650	23.2
1911	130,671,086	17.5	169,614,185	22.7
Increase, 1917 over 1911, per cent	35.8		59.9	
Increase, 1917 over 1913, per cent	9.3		27.6	
Increase, 1917 over 1916, per cent	7.7		12.3	

Eastern District

1917	$73,406,782	13.8	$131,212,564	24.6
1916	68,491,832	15.4	115,941,155	26.1
1915	58,753,501	15.7	96,992,116	25.9
1914	63,545,236	16.0	101,844,880	25.7
1913	70,453,893	17.3	102,705,664	25.2
1912	56,571,947	15.4	90,462,489	24.6
1911	57,228,887	15.9	84,681,339	23.6
Increase, 1917 over 1911, per cent	28.4		54.9	
Increase, 1917 over 1913, per cent	4.2		27.8	
Increase, 1917 over 1916, per cent	7.1		13.2	

Southern District

1917	$27,450,656	17.0	$42,531,259	26.4
1916	24,937,910	17.9	39,204,593	28.2
1915	23,408,863	18.8	31,869,016	25.6
1914	24,786,434	17.6	36,811,102	26.1
1913	26,370,873	18.9	35,164,837	25.2
1912	22,522,219	18.4	31,237,843	25.0
1911	19,134,305	19.4	23,646,482	24.1
Increase, 1917 over 1911, per cent	43.7		79.9	
Increase, 1917 over 1913, per cent	4.1		21.0	
Increase, 1917 over 1916, per cent	9.7		8.5	

Western District

1917	$76,460,419	18.0	$97,108,931	22.9
1916	71,116,100	19.6	85,936,234	23.7
1915	56,703,471	17.9	72,884,241	23.1
1914	62,526,800	19.1	72,304,852	22.1
1913	65,448,172	19.2	74,361,517	21.9
1912	53,708,621	17.6	63,472,318	20.8
1911	54,307,894	18.7	61,286,364	21.1
Increase, 1917 over 1911, per cent	40.8		58.4	
Increase, 1917 over 1913, per cent	16 8		30.6	
Increase, 1917 over 1916, per cent	7.5		13.0	

the much smaller advances granted to the southern and western lines will go into effect. These and especially the advances in eastern territory, will moderate the tendency of earnings and operating expenses to converge and will give the railways larger means for maintenance.

While absolutely the increases in expenditures for maintenance, and especially those for maintenance of equipment, have been large, appearances indicate that they have been due entirely to advances in the wages of labor and in the prices of materials and supplies. In fact, the increases in expenditures for maintenance of way and structures have been so small relatively as to suggest forcibly that railway properties are not being as well maintained, on the whole, as is desirable. Probably this is in a large measure due to the inability of the roads to get enough labor for maintenance of way and partly to fear that if they spend any more they may regret it in future.

The statistics afford material for an interesting study, but it is very difficult to draw any satisfactory conclusion from them as to what future developments will be if the traffic handled and total earnings continue to increase. If there should be a sudden and large shrinkage of traffic and total earnings there probably would be serious trouble for many railways, but no such shrinkage of earnings is now in prospect.

GIVING ENGINEMEN A SECOND CHANCE

ONE of the primary reasons for publishing the discussion on the use of the overlap in automatic signaling, which appears in this issue, is to draw operating men into a fuller consideration of the problem of eliminating those collisions which are due to over running signals. Operating men obviously cannot be informed on the technicalities of signaling, but this matter is not a technicality. It is, strictly speaking, more within the province of the operating department than the signal department. Operating men should know exactly the results they desire to obtain in safeguarding train operation. They are the authorities on each road who must decide whether, through some course of discipline, they will compel obedience to a single stop signal and a single caution signal, whether the enginemen shall be given a second chance by the introduction of a second stop or a second caution signal, or whether an automatic device shall be installed to insure obedience to a single indication.

As pointed out in the discussion referred to, opinions as to the overlapping of stop signals vary over a wide scope from the man who considers this practice a necessary factor of safety to the one who regards it as an absolute menace to safe operation. With the exception of the special cases pointed out in the article, however, the preponderance of evidence is certainly against the overlapping of stop signals. Even those who advocate it do not maintain that it strikes effectively at the cause of the trouble. For caution signals, overlapping is more in favor. The arguments under this head, however, resolve themselves into the well-known pros and cons for so-called "simplified signaling."

The suggestions for dealing with the problem without the use of the overlap bring out the usual methods. One man, in effect, tells his enginemen that they cannot trust the signals, and the one representing the opposite view makes no allowance for an engine passing a stop signal at any time or under any circumstances. There are several points which ought to have further discussion by interested operating officers along this line. Among them are the use of signal instructors to accomplish the dual purpose of instructing the men and inspiring confidence in the signals; the course to be taken when a signal goes to the stop position in the face of a train on a road having strict rules against over running signals; and the loss of time resulting from strict observance of caution signals through a long block.

Letters to the Editor

INITIATIVE—ORGANIZATION AND EDUCATION

CHICAGO, Ill.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

We read so much, nowadays about initiative, how it was recognized in a certain man's rapid rise and how the railroads of the country are beating the brush for men with initiative. The writer is, at present, vice-president and director in two manufacturing concerns employing quite a large number of skilled and unskilled workmen, as well as some of the best salesmen in the country. Outside of his business training, he has had 25 years' experience in railroad work, from track laborer to superintendent, and is thus partially qualified to throw some light on this subject.

It requires considerable nerve in present-day railroading, with its reels of red tape, for a junior official to take the initiative and do what he knows to be good railroading, without the sanction of his superior officer—for he is likely to get a curt letter or message from headquarters (not always dictated by his superior) asking why he exceeded his authority. Such communications often come in plain English over the wire, or in the open mail, so that every operator or clerk is fully aware that the boss has been called down by the man higher up. After he gets two or three such documents, they begin to smart, and he, like thousands of others, joins the clearing house brigade and gets the habit of passing important matters up to higher authority—often without a suggestion, in order to avoid any humiliation by having his action or suggestion criticised. Thus, another man capable of development has an iron band put around him which keeps him from expanding, and the railroad practically loses the investment it has made.

There is no business in the world where so much natural initiative is allowed to perish as in the railroad business. Just look around and see the number of railroad men in other lines of activity—talk to them, and find out why they left the service. One will discover, in many cases, that their initiative was checked by some superior who was not big enough to see the worth of practical suggestions or to give credit where it was due, with the consequence that the man who is alive hunts for fields where he can develop, and he finds them in the commercial world. Knowing railroad officials and their line of comment, as I do, I can tell you in advance that many who read this article, will say it is the babbling of a disgruntled railroad man; on the contrary, let me say again, it comes from one who has always been permitted to do pretty much as he pleased in the various jobs he has filled. My statements are actuated only by sympathy for the thousands of railroad officials in the United States who would like to initiate, instead of going to the vice-president in charge of the department before making the simplest decision. How many times have you witnessed the promotion in subordinate offices of some live youngster to the responsible position of chief clerk, and, in a few days, have headquarters inform the man in charge that they have a man in the general office they will send to take the place. When he arrives it is found he is a near relative of the man higher up, or a close friend who is being taken care of at the expense of the subordinate organization. Don't you think that paralyzes initiative? We have all seen such stunts—not so many today as a few years ago—but too many yet for railroads to be run on the cold blooded business basis they must conform themselves to, before they get the absolute confidence of the public.

One of the best general managers I ever knew said to me one time, "The reason so many officials make failures is

because they still want to run the job they were promoted from instead of leaving that task to their successor." I have kept close tab on this bit of philosophy for years—it has been a great check valve to my own "butting in," as well as a source of amusement while observing other overzealous officials sit up night and day trying to be trainmaster, chief despatcher, road foreman of equipment, fill both roadmasters' shoes as well as run the three most important terminal yards on the division. We sometimes hear some of our keen presidents or vice-presidents say they don't understand what the trouble is with the "River" division—"it ran smoothly when I was superintendent there 20 years ago"; but if he could beat back and compare conditions with 20 years ago, he would find 10 times the correspondence, 2000 ton trains as against 20 loads and 40 empties, inadequate side track facilities, antagonistic labor (made so by our failure to work with labor instead of against it), the Adamson law and hundreds of other state and interstate regulations he must keep posted on in order to avoid violations and consequent embarrassment to the higher officials. Is it any wonder the superintendent neglects some of the minor things in his anxiety to please everybody?

If my vision is not too much in eclipse, the railroads of this country will have during this war and for years thereafter, at least until production overtakes demand, the greatest density of traffic ever known, and their talent and facilities will be taxed to the last ounce of efficiency to keep the good will of the public that they may be allowed sufficient revenues to cover necessary maintenance expenses and to finance additional double tracks, needed terminals, etc. This cannot be brought about by consolidation of divisions to effect economies; new divisions should be created. I know of single-track roads that have as much as 800 miles of busy railroad in one superintendent's division, almost three divisions in one. As a result, the superintendent just hits the high places, never gets a chance to mingle with the businessmen he is serving and exchange ideas with them, and, incidentally, be strong enough to have influence with the public and a voice in sending safe and sane men to our state legislatures and our national congress. I hope to see the day when all the clearing houses between the superintendent and the operating head of the railroad will be eliminated, when there will be closer supervision where the work is done, and the superintendent's office will be what it should—a unit of the operating organization.

In order to obtain or develop initiative and the right kind of organization, real educating must be done. In giving my views to a friend who had just been promoted to an important general superintendency, I told him I heard the agent at one of his most important stations tell the superintendent he could get along without a clerk until the fall rush set in, and the superintendent immediately said, "Don't do it, I would never get authority to put him back." How much better to have permitted the agent to put on and take off help as the business fluctuated, and to have held him strictly accountable for net results. My friend immediately said, "That's my idea of organization, and I shall work accordingly." The very next week he selected a yardmaster for one of his most important terminal stations without even consulting the superintendent, trainmaster or the agent, who were held to strict accountability for the results of that terminal. Then not long afterwards he called a couple of engine foremen from one of his yards into his office and dismissed them for trivial offenses, and the superintendent, trainmaster and yardmaster were not consulted. It took my friend a long time to learn that he could not hold all the subordinate positions under him, and he has since told me that he can't understand why any of his lieutenants stood for it.

Why not start the education of an official at the very beginning of his railroad career, or at least, as soon as he becomes big enough to be placed in charge of even one man, then he will quickly learn to select the best material and that he is held responsible for their performance? The employee will also understand that he is indebted to no one higher up for his position; more especially should such authority be given agents and yardmasters at stations where business is subject to change. If they are not capable of assuming such responsibility, it will soon show in their records and they will have to seek a lower level. My experience has been, however, that there are few failures where the responsibility is checked squarely up to the man in charge and the proper support given him. My idea of railroad education is to drill all classes in the principles of loyalty and line of duty, which can be done on just one basis, viz.: the golden rule.

The most perfect organization I have ever observed was at a small terminal where only about 200 men were employed. In questioning the boss as to why all seemed so anxious to do his bidding, he replied that it took him 15 years to learn never to allow an employee to follow him from one job to another, not even his secretary. It was his theory that the man who could not build an organization out of what he found on any job, wasn't worthy of the name executive; by this treatment he immediately turned the whole bunch into loyal boosters, giving their best licks and all working together. He would employ no one related to him for fear of instilling distrust in some employee's mind. No one could come back to his organization the second time no matter how well he left the service, whether promoted or accepting service elsewhere. All these seemed severe rules to me, but he explained that it was in fairness to the men who stuck on the job. It was surely working well, for every youngster was on his toes trying to see how efficient he could be, for he well knew that no one was going to step in ahead of him when a vacancy occurred. That kind of an organization creates initiative and teaches correct principles of management.

OBSERVER.

EXPORT MORE FROM SOUTHERN PORTS

COLUMBUS, MISS.

TO THE EDITOR OF RAILWAY AGE GAZETTE:

The Car Service Commission has greatly improved conditions generally by modifying the rules with respect to the interchange of cars. The Southern territory, however, is still suffering because of the outbound traffic being greatly in excess of the inbound, especially in Alabama and Mississippi. Several years ago the loads in each direction were about evenly balanced, due largely to the heavy shipments of feed stuff moving from northern markets into the South, but since the southern farmers have diversified their crops and are now raising all of their feed stuffs and shipping their surplus to the northern markets, the outbound shipments are badly out of balance with the inbound when business is normal. During an abnormal business this condition is further aggravated because of the long haul to northern and eastern points and the delay due to congestion and the burdensome task of handling empty cars 1,500 to 2,000 miles back to the Southern territory.

It seems that the only solution of the problem is to work out a plan whereby certain central states may ship a portion of their export traffic to Mobile and New Orleans. This will equalize the load haul in both directions, shorten the empty haul, relieve congestion and save car delays. All roads will then be able to keep cars on their lines approximately equal to their ownership of equipment. It is almost impossible for any line to control its own equipment at all times without taking a step backward, and during an abnormal business, if each road will take car for car, regardless of individual ownership (with the exception of special equip-

ment), it will expedite the movement of traffic and reduce terminal delays in switching.

After the rush period is over, the cars can be worked back in the home direction, but from the present outlook the heavy service demands will continue for some time and there will be a great many old worn out cars condemned and replaced with standard equipment, which will put each road on an equal footing with the rest, so long as they have in their possession cars equal in number to their ownership.

If a plan can be worked out to divide the export shipping between the various ports, I believe the increase in loaded car miles will more than offset any loss due to the pooling of equipment. Additional grain elevators and other storage facilities can be provided at each of these ports if necessary.

F. E. PATTON,
Superintendent, Southern Railway Company in Mississippi.

THE UNIVERSITY OF EXPERIENCE

TOLEDO, O.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have noted with interest the Letter to the Editor entitled, "Give the Engineer a Chance" in the issue of June 29, and would like to refer to the last part of the fourth paragraph, worded as follows: "Surely the engineman, conductor or yardmaster who works up to superintendent is no better fitted for his position than would be an engineer put through the proper course." But the writer destroys an ideal statement of fact by such an absurdity as "there is no magic in railroad operation. When a man learns that the business of a railroad is to move trains, and that no two trains can occupy the same space at the same time, he has mastered the fundamentals." The fundamentals are not as he explains them, but ability to know details which he would pass over so lightly to his subordinates.

A superintendent, to superintend, must be fairly well versed in the thousand and one details which go to make the correct working of a division; ability to recognize inability, practical knowledge of right of way, equipment and working conditions, the art of despatching, methods of accounting and recording, what is and will be required for more efficient management and the knack of meeting sudden increases with present facilities. If his job is only to superintend and secure a capable organization, as he states, how is he to do it if through inability and lacking in actual experience, he is unable to detect flaws, curtail unnecessary movements, and irregular or careless methods or know that his subordinates are co-operating. Figuratively, he may be able to show economy, whereas as an actual fact there will be lost motion and waste.

The trouble with college men is that while well enough versed in the theoretical they are unqualified in the practical details. Should the university require of them at least several years' experience in yards, on the road, at the fire door of a locomotive, along the right of way and at the desks in the different offices, hard work and actual conditions would give them an insight into the many conditions continuously arising and a knowledge of how to meet them. Knowing kinds and working conditions of equipment, transportation rules, methods and details of manipulation and supervision and classes and manners of men, would be the whole basis of his future ability in the application of his theoretical knowledge. To learn such would take several years of his time and he would be young who gains a superintendency at 33.

Railroad men respect a superior who makes every move count and the respect of subordinates is the most important item in co-operation. The superintendent who demands respect because of his title cannot hope to compete with the superintendent who has won respect through ability and personality, for there is confidence in the latter. The superintendent who is not capable of "cutting the buck" in each and every department under him is at a standstill, to be passed by the practical man. That is perhaps why the majority of men who to-day are controlling these great complicated systems of commerce are not college men, but men who have fought their way up and know the game, realizing that every day there is something new to learn.

H. H. MCFILBER.

SOME SUGGESTIONS REGARDING THE FUSEE

ST. LOUIS, MO.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In view of the increasing use of the fusee as a day as well as a night signal for track, bridge, station and train employees, it might be opportune at this time to discuss the improvement and standardization of this important signal. Several roads are now using the five-minute red fusee, some use the 10-minute red, while others use the straight yellow, green, or a combination. This variety of fusees leads to more or less conflict among the men in service as well as the additional expense for store departments to carry so many different kinds in stock.

While the five-minute size recommends itself from the standpoint of lower first cost and less bulk to be carried by trainmen, it seems to be unsatisfactory in spacing trains only five-minutes apart. The straight 10-minute red fusee also has the objection of inflexibly spacing trains 10 minutes apart, requiring a dead stop and waiting until the fusee is burned out. This is quite an item of expense with long, heavy trains, besides the extra five-minute loss of time and additional delay in getting trains started, with the usual accompaniment of drawbars pulled out and air hose burst.

While the most generally-used combination—the red and yellow fusee—is commendable in eliminating the dead stop and consequent five-minute and other delays, after the first five-minute (red) portion is burned out, it seems objectionable, as actual demonstration and observation show that it is difficult and sometimes impossible for an engineman on a swaying engine, with the view often more or less obscured, to distinguish between the yellow and the red portions of the fusee, as the difference between the two colors as now manufactured is not pronounced enough. This fusee would thus often have the very natural effect of the straight 10-minute red fusee with its consequent dead stop and added five-minute delay which this style of a fusee was especially designed to eliminate.

It seems to the writer that a combination five-minute red and five-minute green fusee would give the proper necessary distinctive colors for the instant and certain decision of enginemen, the first half furnishing the following enginemen adequate notice of a train immediately preceding, and the second half being a proceed (green) signal, eliminating the dead stop and consequent delay, while at the same time having the subconscious effect of a cautionary signal without its attendant delay. This proposed fusee might more nearly meet the need where it is desired to space trains only five minutes. It would also more nearly eliminate the necessity and expense of carrying so many styles of fusees in service.

In this connection the writer would like to recommend the ¾-in. size wood base fusee, instead of the more generally used ⅞-in. size. Burning demonstrations of these two sizes of fusee have shown that the ¾-in. size will give the same flame and service results as the larger size, with less cost, bulk and weight.

It seems to be generally conceded that the right hand side of track, outside of the rail, is the proper position for a burning fusee. This avoids a danger from leaking oils, etc.

GRANT SELBY.

North End of the Inbound Freight House.

Pere Marquette Freight Station at Chicago

While of Moderate Size It Embodies Several Special Features and Conveniences of Modern Development

THE Baltimore & Ohio Chicago Terminal recently completed a new freight station at Chicago for the use of its tenant, the Pere Marquette. While this is a station of only moderate size, it embodies an arrangement of the facilities and the use of features recently developed which are worthy of attention. The inbound freight house is 280½ ft. by 52½ ft. in area, one-half of which is two stories and the other half three stories in height. The outbound house is 250 ft. by 18 ft. in area and one story high throughout. The location diagram shows the relative positions of the in and outbound houses with respect to the tracks. The inbound house is served by three tracks and the outbound house by a maximum of six tracks and as the outside track is adjacent to a concrete roadway it can be used for team track purposes.

The Inbound Freight House

The first floor of the inbound house is used for regular inbound freight house service. The second floor is used for storage, the space being leased to shippers at rates provided for in the tariff. The third floor is used entirely for freight offices and the space is divided into a general office 49½ ft. by 60 ft., an agent's and a cashier's office, each 18 ft. by 18 ft., toilet rooms, coat rooms, a stationery room 16 ft. by 19 ft. 6 in., and a record room 40 ft. by 49½ ft.

Communication with the street is afforded by means of a stairway at the north end of the building, with a lobby on the third floor giving direct communication with the cashier's office and the agent's private office, as well as with the general office. Other stairways are provided at the extreme south end and at the center of the house, the latter communicating directly with the record room on the third floor.

The transportation of storage material from the first to the second floor and return is facilitated by two inclined elevators provided by the Otis Elevator Company, Chicago, with provision for the future addition of two similar elevators. These consist of inclined runways on a slope of 16 deg., up which the freight trucks are wheeled with the assistance of an endless chain provided with hooks which engage the axles of the trucks.

Auxiliary facilities on the first floor consist of a cold storage room 18 ft. by 26 ft. in the northeast corner of the building and a "lockup" for the storage of valuables 12 ft. by 18 ft. 6 in., in the northwest corner. The cold storage room is equipped for heating to provide a suitable space for the storage of perishables in winter time. Two platform scales 6 ft. by 8 ft. have been installed with Fairbanks self-recording dials graduated to 1,000 lb.

Structurally the inbound freight house consists of an uncovered steel frame with brick curtain walls and a flat pitch gable roof covered with a composition roofing. It is divided into 20 ft. panels longitudinally, this arrangement controlling the spacing of the steel roof trusses and floor girders. The secondary floor beams in three lines span longitudinally between the girders and support wooden joists spanning transversely. The floors consist of yellow pine subflooring, with a 1½-in. rock mastic surface on the second floor and a 7/8-in. maple wearing surface on the third floor. The first floor is supported on a fill and consists of 6 in. of concrete covered by 1½ in. of rock mastic.

Except at the north end of the building, where space is taken up by the entrance lobby and the special storage rooms, the two sides of the building are enclosed on the first floor by sliding doors continuous from column to column. These are arranged in groups of three each on a separate runway so that two-thirds of the entire space in each 20-ft. bay can be opened for the transfer of freight. The doors along the team side of the building are protected against the weather by an 8-ft. marquis supported on structural steel brackets.

A transverse fire wall divides the building into two sections and is fitted with automatic tin-clad fire doors.

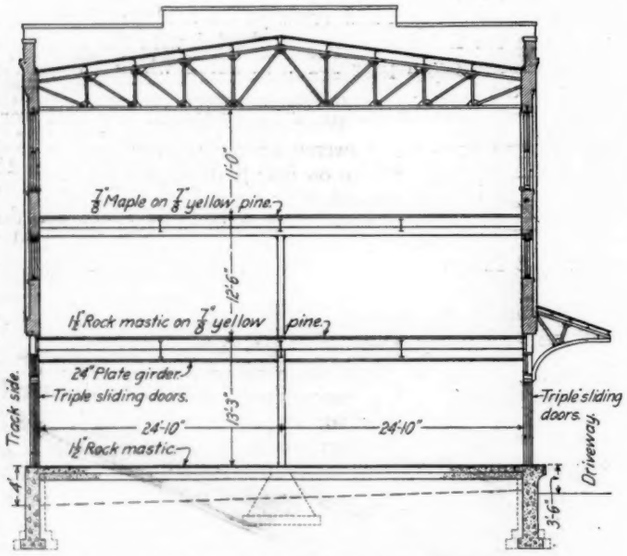
The Outbound Freight House

As the outbound freight house is only 18 ft. in width, outside measurement, it is intended purely for the transfer of freight from street vehicles to cars. The doors are arranged the same as in the inbound house and are continuous from end to end. A platform scales and a checking booth, 6 ft. by 5 ft., are provided at every third panel, giving a total of five in all. Four of the scales have 6-ft. by 8-ft.

View from South End of the Outbound House

platforms and the fifth one, in the middle of the building, lengthwise has a 7 ft. by 12 ft. platform. All of these scales are equipped with Fairbanks automatic dials.

The structural design of this house is simple. Columns consisting of 10-in. 25-lb. I-beams are framed into 13-in., 31.5-lb. I-beams over the transoms which carry 13-in. brick walls to the roof line. The roof consists of ⅞-in. sheathing covered with a composition roofing and supported on 3-in. joists spaced 24 in. center to center and spanning from wall to wall. These roof joists overhang 2½ ft. on the track side and 8 ft. on the team side, thus affording a shelter

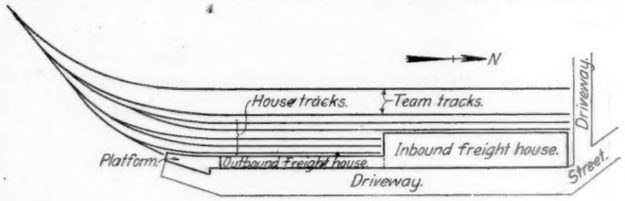


Cross Section of the Inbound Freight House

equivalent to the marquis on the inbound house. The building is stiffened transversely by 3-in. by 3-in. angle irons serving as knee-braces at each panel point.

The outbound house is separated from the inbound house by a rolling steel door arranged for automatic closing by means of a fusible link. At the far or south end of the outbound house a sliding door leads out onto a platform which is used largely for the unloading of automobiles, for which purpose it is provided with an abutting stub track for end door unloading and an incline for rolling the cars to the roadway level. This platform is also equipped with a crane for unloading heavy machinery and other commodities not readily handled through the freight house.

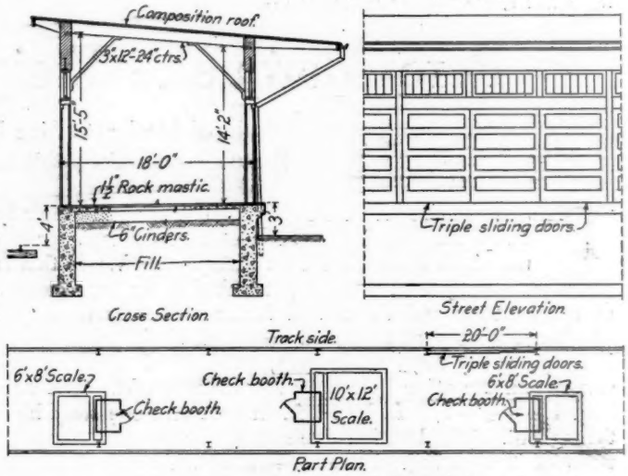
The teamway along the side of the freight house is graded to give a maximum of convenience in the transfer of freight between street vehicles and the house. Along the outbound



Plan of the Station and Tracks

house where the movement is from the wagons to the house, the roadway is only 3 ft. lower than the floor level so that most of the wagon beds or truck beds would be higher than the floor. Along the inbound house where the movement of freight is from the house to the trucks, the roadway is 3 ft. 6 in. lower than the floor so that the floor would be higher relative to the wagons.

The design and the construction of this house was under the general direction of F. L. Stuart, until recently chief en-



Details of the Outbound Freight House

gineer of the Baltimore & Ohio and the Baltimore & Ohio Chicago Terminal. The design was under the immediate direction of M. A. Long, assistant to the chief engineer of the Baltimore & Ohio, and the construction was under the direction of L. G. Curtis, district engineer of the Baltimore & Ohio Chicago Terminal. The contractor was the Drumm Construction Company, Chicago.

Electric Power for Swiss Lines.—The total Swiss railway system, Federal and other, amounts to 3,216 miles, of which 1,700 miles are Federal and 1,516 miles are owned by corporations. Of the private lines 622 miles are already electrified, but only about 50 miles narrow gage and other of the Federal railways are operated by electricity. Looking to further electrification, the Federal railways already have acquired numerous water-power properties in the valleys of the Reuss, Leventina, Rhone, and in the Trient, Canton Valais, and elsewhere. In all 10 electric water plants are projected, with 500,000 horsepower efficiency. Two of these, the Amsteg and the Ritom works, produce 152,000 horsepower, designed to supply the Gotthard Railway from Lucerne to Chiasso.

Interstate Commerce Commission Enlarged

Priority Bill Passed; Study of Waterway Problem; Railway Commissioners' Annual Meeting; Income Tax

WASHINGTON, D. C., August 7, 1917.

THE bills to authorize the President to direct that certain shipments shall have preference or priority in transportation during the war, and to enlarge the Interstate Commerce Commission from seven to nine members and authorize it to reorganize its work by divisions were sent to the President for signature on August 6. The Interstate Commerce Commission bill carries a new provision inserted in conference, that until January 1, 1920, no increased rate may be filed without the approval of the commission. The priority bill also carries a provision to prevent obstruction of interstate commerce.

The conference committees, appointed to reconcile the differences between the House and the Senate in the bills, submitted their reports on August 3 and the compromise bills agreed upon in conference were adopted by the House of Representatives on the following day and by the Senate on August 6.

The priority bill as passed contains the provision inserted in the House authorizing the President to issue priority orders direct or through such person or persons as he may designate or through the Interstate Commerce Commission. It also contains the provision of the Senate bill with some changes, authorizing the carriers, without responsibility or liability on the part of the United States, to establish and maintain in the city of Washington during the period of the war an agency empowered by such carriers as join in the arrangement, to receive notice and service of such orders and directions as may be issued. This, of course, refers to the Railroads' War Board, the Executive Committee of the Special Committee on National Defense of the American Railway Association, whose sub-committee, the Commission on Car Service, has the necessary organization for complying with orders to give preference to commodities or special shipments essential for war purposes. Before the bills were originally passed in the House and in the Senate, the proposed provision for compensating the carriers for loss or damage suffered by reason of complying with a priority order had been eliminated, provision being made, however, for the fixing of rates for transportation in carrying out the orders of the President by the Interstate Commerce Commission. The text of the priority bill as passed is as follows:

TEXT OF PRIORITY BILL

"That section 1 of the act entitled 'An act to regulate commerce,' approved February 4, 1887, as heretofore amended, be further amended by adding thereto the following:

" 'That on and after the approval of this act any person or persons who shall, during the war in which the United States is now engaged, knowingly and willfully, by physical force or intimidation, by threats of physical force obstruct or retard, or aid in obstructing or retarding, the orderly conduct or movement in the United States of interstate or foreign commerce, or the orderly make-up or movement or disposition of any train, or the movement or disposition of any locomotive, car, or other vehicle on any railroad or elsewhere in the United States engaged in interstate or foreign commerce shall be deemed guilty of a misdemeanor, and for every such offense shall be punishable by a fine of not exceeding $100 or by imprisonment for not exceeding six months, or by both such fine and imprisonment; and the President of the United States is hereby authorized, whenever in his judgment the public interest requires, to employ the armed forces of the United States to prevent any such obstruction or retardation of the passage of the mail, or of the orderly conduct or movement of interstate or foreign commerce in any part of the United States, or of any train, locomotive, car, or other vehicle upon any railroad or elsewhere in the United States engaged in interstate or foreign commerce: *Provided*, That nothing in this section shall be construed to repeal, modify, or affect either section 6 or section 20 of an act entitled "An act to supplement existing laws against unlawful restraints and monopolies, and for other purposes," approved October 15, 1914.

" 'That during the continuance of the war in which the United States is now engaged the President is authorized, if he finds it necessary for the national defense and security, to direct that such traffic or such shipments of commodities as, in his judgment, may be essential to the national defense and security shall have preference or priority in transportation by any common carrier by railroad, water, or otherwise.

"He may give these directions at and for such times as he may determine, and may modify, change, suspend, or annul them, and for any such purpose he is hereby authorized to issue orders direct, or through such person or persons as he may designate for the purpose or through the Interstate Commerce Commission. Officials of the United States, when so designated, shall receive no compensation for their services rendered hereunder. Persons not in the employ of the United States so designated shall receive such compensation as the President may fix. Suitable offices may be rented and all necessary expenses, including compensation of persons so designated, shall be paid as directed by the President out of funds which may have been or may be provided to meet expenditures for the national security and defense.

"The common carriers subject to the acts to regulate commerce or as many of them as desire so to do are hereby authorized without responsibility or liability on the part of the United States, financial or otherwise, to establish and maintain in the city of Washington during the period of the war an agency empowered by such carriers as join in the arrangement to receive on behalf of them all notice and service of such orders and directions as may be issued in accordance with this act, and service upon such agency shall be good service as to all the carriers joining in the establishment thereof. And it shall be the duty of any and all the officers, agents, or employees of such carriers by railroad or water or otherwise to obey strictly and conform promptly to such orders, and failure knowingly and willfully to comply therewith, or to do or perform whatever is necessary to the prompt execution of such order, shall render such officers, agents, or employees guilty of a misdemeanor, and any such officer, agent, or employee shall, upon conviction, be fined not more than $5,000, or imprisoned not more than one year, or both, in the discretion of the court.

"For the transportation of persons or property in carrying out the orders and directions of the President, just and reasonable rates shall be fixed by the Interstate Commerce Commission; and if the transportation be for the Government of the United States, it shall be paid for currently or monthly by the Secretary of the Treasury out of any funds not otherwise appropriated. Any carrier complying with any such order or direction for preference of priority herein authorized shall be exempt from any and all provisions in existing law imposing civil or criminal pains, penalties, obligations, or liabilities upon carriers by reason of giving

preference or priority in compliance with such order or direction.' "

Enlargement of I. C. C.

The differences between the bill for the enlargement of the Interstate Commerce Commission, as agreed upon in conference, and the bill as passed by the House, include a substitute for the amendment added by Senator Smith in the Senate, which would require the commission to suspend an advance in rates whenever a protest was made by anybody in the United States. The Senate conferees insisted on this amendment or something equivalent thereto, but an agreement was finally reached on a provision that until January 1, 1920, no increased rate, fare, charge or classification shall be filed except after approval thereto has been secured from the commission. Such approval may, in the discretion of the commission, be given without formal hearing and in such case would not affect any subsequent proceeding. In explaining this provision in the House, Chairman Adamson of the Committee on Interstate and Foreign Commerce, said that this question had involved considerable heated discussion in conference and twice it had been agreed to report a disagreement, but finally it was suggested that a period of time should be allowed before legislating on such an important change. Before agreeing on the substitute finally adopted, he said, the conferees had called before them a representative of the railroads and members of the Interstate Commerce Commission. The representative of the railroads, he said, had no objection to make and both he and the commissioners agreed that the amendment would be workable, because in proposing an increase of rates the railroads will state to the commission what the proposition is and if the commission is not satisfied either from the record or from what it knows of the situation, it will have hearings and then approve or disapprove the rates. But it was stated, Mr. Adamson said, that the commission in many cases could tentatively allow the increase and give the matter further consideration later, if necessary.

Another amendment was adopted for the purpose of providing for rehearings by the commission on cases decided by subdivisions of the commission, as provided in section 16a of the act itself for rehearing cases decided by the commission.

It was provided that in proceedings before the subdivisions relating to the reasonableness of rates or to alleged discriminations no less than three members shall participate and in proceedings relating to valuation not less than five members shall participate.

The provision in the original bills, as introduced, for an increase in the salary of the secretary of the commission was not adopted and the salary is specifically fixed at $5,000. The text of the bill as passed is as follows:

"That section 24 of an act entitled 'An act to regulate commerce,' approved February 4, 1887, as amended, be further amended to read as follows:

" 'Sec. 24. That the Interstate Commerce Commission is hereby enlarged so as to consist of nine members, with terms of seven years, and each shall receive $10,000 compensation annually. The qualifications of the members and the manner of the payment of their salaries shall be as already provided by law. Such enlargement of the commission shall be accomplished through appointment by the President, by and with the advice and consent of the Senate, of two additional Interstate Commerce Commissioners, one for a term expiring December 31, 1921, and one for a term expiring December 31, 1922. The terms of the present commissioners, or of any successor appointed to fill a vacancy caused by the death or resignation of any of the present commissioners, shall expire as heretofore provided by law. Their successors and the successors of the additional commissioners herein provided for shall be appointed for the full term of seven years, except that any person appointed to fill a vacancy shall be appointed only for the unexpired term of the commissioner whom he shall succeed. Not more than five commissioners shall be appointed from the same political party.'

"Sec. 2. That section 17 of said act, as amended, be further amended to read as follows:

" 'Sec. 17. That the commission may conduct its proceedings in such manner as will best conduce to the proper dispatch of business and to the ends of justice. The commission shall have an official seal, which shall be judicially noticed. Any member of the commission may administer oaths and affirmations and sign subpoenas. A majority of the commission shall constitute a quorum for the transaction of business, except as may be otherwise herein provided, but no commissioner shall participate in any hearing or proceeding in which he has any pecuniary interest. The commission may, from time to time, make or amend such general rules or orders as may be requisite for the order and regulation of proceedings before it, or before any division of the commission, including forms of notices and the service thereof, which shall conform, as nearly as may be, to those in use in the courts of the United States. Any party may appear before the commission or any division thereof and be heard in person or by attorney. Every vote and official act of the commission, or of any division thereof, shall be entered of record, and its proceedings shall be public upon the request of any party interested.

" 'The commission is hereby authorized by its order to divide the members thereof into as many divisions as it may deem necessary, which may be changed from time to time. Such divisions shall be denominated, respectively, division 1, division 2, etc. Any commissioner may be assigned to and may serve upon such division or divisions as the commission may direct, and the senior in service of the commissioners constituting any of said division shall act as chairman thereof. In case of vacancy in any division, or of absence or inability to serve thereon of any commissioner thereto assigned, the chairman of the commission, or any commissioner designated by him for that purpose, may temporarily serve on said division until the commission shall otherwise order.

" 'The commission may by order direct that any of its work, business, or functions arising under this act, or under any act amendatory thereof, or supplemental thereto, or under any amendment which may be made to any of said acts, or under any other act or joint resolution which has been or may hereafter be approved, or in respect of any matter which has been or may be referred to the commission by Congress or by either branch thereof, be assigned or referred to any of said divisions for action thereon, and may by order at any time amend, modify, supplement, or rescind any such direction. All such orders shall take effect forthwith and remain in effect until otherwise ordered by the commission.

" 'In conformity with and subject to the order or orders of the commission in the premises, each division so constituted shall have power and authority by a majority thereof to hear and determine, order, certify, report, or otherwise act as to any of said work, business, or functions so assigned or referred to it for action by the commission, and in respect thereof the division shall have all the jurisdiction and powers now or then conferred by law upon the commission, and be subject to the same duties and obligations. Any order, decision, or report made or other action taken by any of said divisions in respect of any matters so assigned or referred to it shall have the same force and effect, and may be made, evidenced, and enforced in the same manner as if made or taken by the commission, subject to rehearing by the commission, as provided in section 16a hereof for rehearing cases decided by the commission. The secretary and seal of the commission shall be the secretary and seal of each division thereof.

" 'In all proceedings before any such divisions relating to the reasonableness of rates or to alleged discriminations not

less than three members shall participate in the consideration and decision and in all proceedings relating to the valuation of railway property under the act entitled "An act to amend an act entitled 'An act to regulate commerce,' approved February 4, 1887, and all acts amendatory thereof, by providing for a valuation of the several classes of property of carriers subject thereto and securing information concerning their stocks, bonds, and other securities," approved March 1, 1913, not less than five members shall participate in the consideration and decision.

" 'The salary of the secretary of the commission shall be $5,000 per annum.

" 'Nothing in this section contained, or done pursuant thereto, shall be deemed to divest the commission of any of its powers.'

"Sec. 3. So much of section 18 of the act to regulate commerce as fixes the salary of the secretary of the commission is hereby repealed.

"Sec. 4. That paragraph 2, section 15, of the act to regulate commerce approved February 4, 1887, as amended, be further amended by adding the following: *'Provided further*, until January 1, 1920, no increased rate, fare, charge, or classification shall be filed except after approval thereof has been secured from the commission. Such approval may, in the discretion of the commission, be given without formal hearing, and in such case shall not affect any subsequent proceeding relative to such rate, fare, charge, or classification.' "

Commission for Comprehensive Study of Waterway Problems

The River and Harbor appropriation bill passed by Congress last week contains a provision for a waterways' commission of seven members to bring into co-ordination and co-operation the engineering, scientific and constructive services, bureaus, boards and commissions of the several governmental departments of the United States and commissions created by Congress that relate to the study, development or control of waterways and water resources and subjects relating thereto, or to the development and regulation of interstate and foreign commerce, with a view to uniting such services in investigating with respect to all watersheds of the United States all questions relating to the development, improvement, regulation and control of navigation as a part of interstate and foreign commerce. The investigation is to include the related questions of irrigation, drainage, forestry, reclamation, etc., the co-operation of railways and waterways, and promotion of terminal and transfer facilities. The commission is to secure the necessary data and formulate and report to Congress as early as practicable a comprehensive plan or plans for the development of the water resources of the United States for the purposes of navigation and for other useful purposes, and recommendations for the modification or discontinuance of any project heretofore adopted. The commission is to be appointed by the President and at least one of its members shall be chosen from the active or retired list of the engineering corps of the army. At least one shall be an expert hydraulic engineer and the remaining five may be selected either from civil life or the public service. The commission is authorized to employ experts for its investigation and for its expenses the sum of $100,000 is appropriated.

State Commissioners to Consider War Time Transportation

The effect of the war on various problems pertaining to railroad transportation and its regulation is to be the principal topic for discussion at the twenty-fifth annual convention of the National Association of Railway Commissioners to be held in Washington beginning on October 16, according the announcement of the meeting just issued. The association is composed of members of state railroad and public utility commissions and the Interstate Commerce Commission.

Active co-operation of the association "in the matter of federal control over operation of railroads to meet military and industrial requirements" will be among the subjects to be discussed.

"The time calls imperatively for unified action by all men charged with public responsibility," the announcement said. "At this convention the present vital problem of public utility regulation, including the public utilities' function in serving the nation's need, the requests of railroads and other public utilities for increases in rates and for authority to diminish or discontinue service and the requests of the public for reasonable rates and more adequate service, will be fully discussed with a view to uniform, constructive action by the various states and federal regulatory commissions."

Increase in Income Tax Proposed

The revised war revenue bill intended to raise $2,000,000,000 in taxes during the ensuing year was reported to the Senate on August 6 by the Finance Committee, which has been working on the bill since it was passed by the House in May. The provision for a corporation income tax, which the committee expects will raise $162,000,000 was modified to increase the normal income tax from 4 per cent to 6 per cent on net income. The committee also decided to reduce from 15 per cent to 10 per cent the tax rate on undistributed surplus and to exempt from this tax the undistributed surplus actually invested or employed in business or retained for employment in the reasonable requirements of the business.

PHOTOGRAPHING STANDARD PLANS

By J. G. Wishart

Office Engineer, C. R. I. & P., Chicago, Ill.

Standard plans have been regarded as a necessity by railroad organizations for many years and many economies have been effected by their adoption and use. However, they should be gotten out in a form that can be conveniently handled, and this is generally accomplished by reducing the copies intended for general distribution to a small size. There are several processes of accomplishing the reduction. One method, adopted by several railroads, is the zinc etching process, but there are objections to this method which detract somewhat from its desirability. To obtain a low unit cost a large number of copies of each plan must be purchased and as standards are being revised continually and a change of any kind in a standard destroys the usefulness of all copies made prior to the revision many of the copies may become worthless. Another drawback to this system is the large amount of space required to store a supply of the prints and the zinc plates.

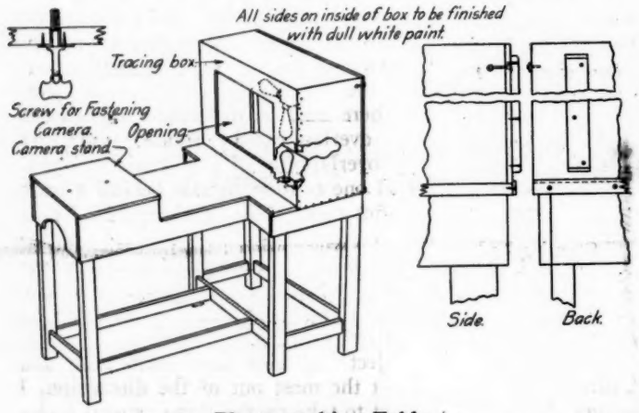
Probably the most economical method of producing the reduced size prints is to photograph the original tracing on a film and make blue line prints from the negative. The initial cost of the negative is low as compared to zinc or other plates, the cost of blue line prints in small quantities is less than that of printed copies from other processes, and only a small amount of filing space is required for storing the negatives and a sufficient number of prints to supply current demands.

To obtain the full economy of the photographic method, the negatives should be made by the regular employees of the engineering department rather than a professional photographer. Anyone with any experience in amateur photography can produce first-class results by following the procedure in use in the engineering department of the Chicago, Rock Island & Pacific, which is outlined below. The prime requisite of the photo method is to obtain clear

cut, fast printing negatives suitable for blue printing in an electric printing machine. It was only after several months of experimenting that the method adopted was worked out successfully.

The size of a standard tracing on the Rock Island is 24 in. by 36 in. and for convenience in handling in correspondence a width of 8¼ in. was adopted for the smaller prints, making the length 12 in. A special size film 9 in. by 14 in. coated with process emulsion was obtained from one of the large photographic supply companies which reduced the waste on films to the minimum. This film is especially adapted for copying black line drawings and when properly exposed and developed produces a clear cut fast printing negative which can be run through a continuous electric blue printing machine along with ordinary tracings to produce first class prints on the ordinary grade of blue print paper. When printed in this way these negatives can be used to fill in vacant spaces left by odd sized tracings and make use of what otherwise would be waste blue print paper.

Next in importance is the equipment for photographing. Any first class view camera of sufficient size fitted with an anastigmat lens will suffice. The equipment used on the Rock Island consists of an 11 in. by 14 in. Improved Empire State view camera, fitted with a Turner-Reich Anastigmat, F 6.8, series 11, No. 5 lens mounted in a compound shutter. It is mounted on a table to which the illuminating box is attached as shown in the sketch. The latter is designed to



Photographing Table

throw the proper amount of light, evenly distributed, on the tracing during the exposure of the negative and is designed to accommodate the standard size tracings. The back of the box consists of a perfectly flat board reinforced to prevent warping and made removable. The tracings are mounted on this board while being photographed. The opening in the front of the box is just large enough to permit the lens to cover the entire back of the box when in focus for a negative 9 in. wide. The entire inside of the box is painted a flat white. The lights, ten 100-watt tungsten lamps, are mounted inside the box around the opening in the front and reflectors placed behind them give a uniform illumination over the entire surface of the tracings. In consequence all negatives are of equal density from which prints of equal tone can be made with the same length of exposure. The advantage of this can readily be appreciated as it permits a number of negatives being run through the blue print machine at the same speed. The results obtained with this box are so far superior to those with natural light that there is no comparison. The variation in the intensity of natural light is so great at different times of the day and under varying weather conditions that it is next to impossible to get uniform or even satisfactory negatives, unless an expert is employed to do the work.

A necessary adjunct of this work is the darkroom and owing to a lack of unused space it was necessary to be content with a room 10 ft. square. The camera stand is located in the darkroom, enabling the entire operation of exposing and developing to be completed in the one place. It is equipped with shelves, a cabinet for storing supplies, a built-in table for developing and a sink with running water for washing films and prints. The window is in the north wall and is fitted with a sliding panel to permit daylight printing of photo paper prints when desired. This can also be utilized for lighting the room when not exposing or developing.

Complete equipment is not the only factor in obtaining results. The exposure and development of the film are of equal importance. Focusing for the exposure must be done carefully. It will pay to make frequent use of a magnifying glass to examine the distinctness of the image on the ground glass as each line must show up clear cut. With ten 100-watt Tungsten lamps in the illuminating box, an exposure of 12 sec. through an F-16 orifice has been found sufficient for new and unsoiled tracings, while exposure ranging up to 20 sec. will be necessary for old and soiled tracings, depending upon their condition. With the process emulsion film the following formula for the developer is giving perfect satisfaction:

Sulphite of soda	9	oz.
Carbonate of soda	6	oz.
Hydrochinon	1½	oz.
Bromide of potassium	¼	oz.
Water	60	oz.

The above formula is for a stock solution: to develop dilute this with equal parts of water and add ½ oz. of a 10-per cent potassium bromide solution to 8 oz. of the developer when ready for use. With a correct exposure 20 min. development in this solution will produce a film of proper density. After the development is complete the film should be fixed in an acid-fixing bath prepared as follows:

Solution A.		
Pure water	96	oz.*
Hypo (crystals)	2	lbs.
Sulphite of soda	2	oz.
Solution B.		
Pure water	32	oz.
Chrome alum	2	oz.
Sulphuric acid, C. P.	¼	oz.

*Avoirdupois weights.

In mixing the fixing solutions be sure that the chemicals are entirely dissolved, then pour solution *B* into *A* slowly while stirring *A* rapidly. This bath will fix a large number of negatives and when exhausted should be discarded. Never attempt to restore it by adding hypo. Negatives left for a long time in this bath harden and are more durable. During development the developing solution should not be permitted to get warmer than 65 deg. F. In a first class negative, the lines should be absolutely clear after fixing and when laid on a sheet of white paper should show white.

Films have the advantage over glass plates that they can be blue-printed in a machine, and occupy only a small space for filing and storing. The filing case in the Rock Island office will accommodate 260 films together with about 30 prints of each and occupies a floor space of only 15 in. by 3 ft. 4 in. The photographer is charged with the duty of keeping a supply of prints of each negative in this case at all times in order that requests for them may be filled as soon as received.

The economy of installing a complete outfit as described above depends on the amount of work to be done. At the present cost of material, the saving on 500 film negatives alone, which would cost about $2.50 each if made by a professional, should pay for the complete equipment. In addition to this there is the saving in the amount of blue printing as these small sized prints can be made to serve the purpose on a majority of the requests for prints of standard plans. With the normal price of blue print paper this item is well worth consideration.

Operating Men Discuss Use of the Overlap

Provision of Two Stop or Two Caution Signals Behind Trains Not Generally Favored Except for Special Cases

SINCE there is no such organization as the Association of Operating Vice-Presidents, that title will serve as well as any other to designate a group of prominent railway executives who recently discussed in some detail the practice of providing two stop or two caution signals in the rear of a train by the arrangement which in automatic signal control circuits is commonly termed the overlap. In addition to the 45 operating officers in this fictitious organization, the discussion was participated in by several signal engineers in the role of expert witnesses and by one government officer with considerable experience in signaling and the investigation of accidents. On account of its imaginary character, the A. O. V. P. was able to go further than any of the other railway organizations in conducting its work without a meeting, all discussions being submitted in writing to one individual who prepared the proceedings in the form which they might have assumed if the 50 or more men who participated had actually been gathered in one room. While the following, therefore, is the fictitious report of an imaginary meeting, the facts presented are none the less real, and the opinions expressed are from some of the best known operating men in the country.

PRESIDENT.—As the call for this meeting was limited to the representatives of 56 companies which make considerable use of block signals, the large attendance indicates very clearly the importance of the subject announced and the interest you have in it. The chairman of the program committee is responsible for the selection of the subject as he was recently led to investigate the matter very fully in connection with an unfortunate collision on his road resulting from an engineman over-running a stop signal. He convinced the officers of the association that while it may seem a rather technical matter to come before this organization, it is one which, in the interest of safe operation, we should know more about. As I have no doubt the details of the subject are somewhat hazy in your minds, as they were in my own when it was first presented to me, I have taken the precaution to invite a signal engineer, known to many of you, to state briefly the principle of the overlap and its relation to other operating problems.

SIGNAL ENGINEER.—The overlap in signaling simply means the extension of the control of a signal to some point beyond the next signal in advance, or, in other words, the control circuits are overlapped. The principle was very early used in automatic signaling when only two indications, stop and proceed, were given, to render unnecessary the provision of a separate distant signal to warn an engineer that a stop would be required at the next signal in advance. Under this system, a train passing signals A, B and C in the order named would not only hold signal B at stop while in the block from B to C, but it would also hold signal A at stop until it passed C. Thus a following train encountering a stop signal would have a full block length in which to stop after passing the signal.

When automatic signaling came to be applied to single-track lines, the overlap played an important part in providing adequate protection against opposing movements. Also, in recent years, in the signaling of dense traffic lines, on which there are exceptional hazards in case of collision, such as subways, elevated lines, electrified terminals, etc., the overlap has been frequently used in addition to distant signals, and in some cases in addition to automatic stops. Some roads overlap the stop signal under much less exacting conditions than those mentioned, but the majority of roads are against this practice. Others which oppose the overlapping of the stop signal on the ground that adequate advance information can be provided in the signal system, find occasion sometimes to overlap the caution or distant signal or to use the so-called three-block system of indication which is one of the schemes provided for in the A. R. A. standard code. Under this latter scheme the first signal behind a train indicates Stop; the second, Prepare to stop at next signal, and the third, Approach the next signal at limited speed.

For your purpose the subject can be narrowed down considerably. It may be conceded at once that the overlap is necessary in old installations, a few of which are still in service, where no distant indications are provided, since without such indications the engineman cannot be held strictly responsible for stopping at a stop signal, although there is always the possibility of a train standing immediately ahead of the signal. It is also obvious that the overlap is necessary in single-track automatic signaling where this feature for following movements is secured incidentally in the provision of adequate protection against butting collisions. Further, in subway signaling, or under conditions approaching those of subway operation, every possible special provision is warranted, and there is little ground therefore for argument as to the use of overlaps in such cases. The grounds on which there may be differences of opinion regarding the use of the overlap can be divided into three general parts: First, the overlapping of stop signals to provide at least two stop and one caution signals behind a train on a line of normal traffic; second, the overlapping of caution signals to provide one stop and two or more caution signals behind the train, or the alternative use of three-block indications; and third, means for preventing collisions caused by failure to obey signal indications in the absence of such a precaution as overlapping.

PRESIDENT.—The subject has now been introduced and outlined. In order to get the most out of the discussion, I suggest that it will be best to take up the three general topics in their order.

THE USE OF TWO STOP SIGNALS

V. P. 32.—As a representative of a road using the overlap, I am glad to open this discussion. There are two general conditions under which accidents caused by over-running a danger signal are likely to occur, and which require special attention in the installation of automatic signal protection: First, when dense traffic or adjacent interlocking plants require the spacing of home signals less than braking distance apart; and second, when conditions require the location of a signal a short distance in the rear of a water tank, station, or other point where trains stop. Our first endeavor in such cases is to provide a liberal distance—say 800 to 1,500 ft.—from the signal in advance, or the point to be protected to the next signal in the rear. In addition, we generally provide an overlap and when by both of these measures a safe stopping distance has not been obtained, we add the feature of repeating the caution indication at the next signal in the rear. We have had an entirely satisfactory experience with the overlap. We recognize the necessity for safeguarding against human error. We, therefore, believe in immediate obedience to signal indications, but with a factor of safety to guard against a mistake. The overlap provides such a factor.

V. P. 28.—We all recognize the conditions just mentioned but on our road, we do not meet them in the way that has

just been outlined. Our practice is to locate the home signal a minimum distance of 500 ft. in the rear of the point we desire to provide special protection for, although in some cases conditions are not favorable to obtain this minimum distance and we have to be satisfied when we come as near it as possible. We do not, however, overlap the stop position of our signals, as we admit of no reason for carrying the control of the stop indication beyond the limits of the block over which the signal governs. The men who are to be guided by the signal must be educated that it is imperative to stop before passing a signal at stop. To overlap the stop control is an invitation to the men to regard the stop indication less positively.

V. P. 36.—While we do not use the overlap except on districts where one-arm two-position automatic signals are still in use, it is largely because the expense is not thought to be warranted, as we do not have high-speed passenger trains with the frequency obtaining on some other lines. We consider the overlap an important adjunct, however, on both the home and distant and the three-position systems of signaling on roads with a dense passenger movement and high-speed trains following each other closely.

S. E. 33.—We do not use the overlap except in one large terminal and personally I am strongly of the opinion that it cannot be justified except under conditions of that kind. If the giving of one more chance to an engineman would insure his obeying a second indication, good reasons might be advanced in favor of the overlap. But in many accidents caused by overrunning signals, there was full braking distance between the stop signal and the standing train, thus reproducing the conditions of an overlap, showing that little or no additional safety is secured by its use. Those who advocate the overlap may also fail to take into consideration the complications which are met in interlocking plants and the impracticability of providing complete overlapping protection, especially when it is endeavored to overlap the protection for switches.

V. P. 22.—In our estimation, signaling in territory where the speed is high and train service frequent, requires an overlap to give the maximum degree of safety. This is on the same principle that a space is always provided between a home interlocking signal and the derail ahead of it.

V. P. 37.—I know that our signal engineer has some views in direct contrast to those expressed by the last speaker, and I am going to ask him to say a few words.

S. E. 37.—I think the overlap is not only unnecessary, but dangerous. As stated before, it is impossible to provide it in all cases, and to have overlaps at some places and not at others, would make for unsafe conditions, as it does not take long for engineers to find out that the overlap is used and this has a tendency to cause them to pay less attention to the signal indications than if they knew that the block ends at each signal. If an engineer cannot be made to stop at a home signal, it is a foregone conclusion that he cannot be made to stop at the end of an overlap where there is no indication to mark the point.

V. P. 9.—In general, I would agree with the signal engineer, but our practice is to use the overlap in some special cases. First, on portions of our signal system which are old, and on which no approach information is given, each stop signal is overlapped to a point braking distance beyond the next stop signal. In the second place, we have a few points where a stop signal had to be located at the approach end of a station platform, and in these cases an overlap the length of the platform was installed, this length never being over 500 ft. however.

V. P. 15.—We have a practice on single track somewhat similar to that referred to by V. P. 9. We overlap the control of the second signal on each side of stations for a distance of 800 ft. While the train is in this 800-ft. zone, it is protected from the rear by one caution and two stop signals. After it passes out of this zone it is protected in the rear by one caution and one stop signal, the same as at other points.

V. P. 7.—In all cases where we do not have distant signals or three-position signals, we use an overlap varying in length from 2,000 to 3,000 ft. depending on local conditions. There are so many places in the country where this is desirable that it does not seem to me the overlap should be condemned. I know that there are many roads which have not been represented by previous speakers on which the overlap is used. The latest block signal statistics of the Interstate Commerce Commission, dated January 1, 1917, show a total of 16,671.2 miles of road, on which automatic signals are overlapped. As this is slightly more than 50 per cent of the total automatic block signal mileage in the country, it would indicate that the overlap is still held in considerable favor by American railways.

V. P. 39.—Replying to the quotation of statistics just made, I would like to correct the impression made. The table referred to also shows 19,403 miles of track on which overlapped automatic signals are in service, or only 2,731.8 miles more than the figures for miles of road. This indicates very plainly therefore that the large mileage of overlapped signals is due to the large mileage of single-track automatic signaling which is in service, and on which, as previously explained, the overlap is essential primarily for head-on protection.

V. P. 13.—There is another possible source of error in the figures referred to. I had occasion recently to check the report from my own road and found that we had reported a considerable double-track mileage as overlapped on the interpretation of the I. C. C. request as covering the clear indication of our three-position signals, the control of which extends beyond the signal in advance. I am now convinced that this interpretation was not correct.

V. P. 39.—As to the favor in which the overlap is held by American railways, I believe the signal engineers of the country are in a good position to speak with authority. A committee of the Railway Signal Association, considering this subject, presented a report to the two stated meetings of that association this year, in which it was stated "Overlaps are undesirable for following movements, as adequate advance information can be provided in the signal system." My personal opinion is that overlaps, whether resulting in two stop signals and a caution signal, one stop signal and two caution signals, or five or six stop signals and five or six caution signals are pernicious, although the committee has not made the statement quite so emphatic. I would also bring to your attention as operating men, the self-evident fact that no signal system can be successfully designed and no set of rules properly formulated which are predicated on disregard of the signal indications and violations of the rules.

PRESIDENT.—It seems evident that the majority of opinion as to the overlapping of stop signals is against the practice. I would suggest that we pass to the overlapping of the caution indication, or the double distant as it is frequently called, and any further facts on the general question can be brought out when we turn to a consideration of substitutes.

THE USE OF TWO CAUTION SIGNALS

V. P. 28.—While, as stated before, we do not overlap the stop position of our signals, we do in special cases overlap the caution position, this being done where there is less than braking distance between home signals or on steep downward grades where the alinement is very crooked. As a rule, we do not favor the double-caution indication but there may be special local conditions that make it advisable.

V. P. 9.—We also follow the practice of giving additional approach information when two stop signals are less than braking distance apart, but it is important to explain in connection with such a practice that we never give the in-

dication, "Approach the next signal prepared to stop," at a greater distance from the stop signal than we can reasonably expect a man to remember it. Our established basic distance in high-speed territory is one mile, and the maximum distance is 7,500 ft.

V. P. 13.—Wherever conditions require the spacing of signals less than braking distance apart such as may be necessary at interlocking plants, we carry back the caution indication to the second signal in the rear so that when the signal furthest in advance is at stop, it will be preceded by two caution signals. This arrangement insures stopping distance between the first caution signal and the stop signal.

V. P. 14.—We have recently installed the double-distant system in suburban territory where the blocks are short, and we believe that the caution indication should be carried back to the second block under conditions of this kind.

V. P. 39.—I am personally as much opposed to overlapping the caution indication as the stop indication. Properly designed signal systems provide full braking distance at authorized maximum speeds, either by spacing the signals full braking distance apart, or where this is impossible, providing what is called three-block indications. If the information given by these signals is observed, protection for fast trains and facility for all trains is provided.

V. P. 28.—I rather anticipated some criticism on my former statement that we use double-distant indications on down grade. We know there are arguments against this practice, but we feel that it is justified. The two principal arguments against it are that enginemen will not strictly observe the indication, and that the speed of a train on such a grade should be such that it can be brought to a stop before passing the home signal upon receiving one caution indication. The first reason should not be countenanced at all as it is an admission of weak operating practice. The second is better, but, after all, this is a matter which should be decided according to the operating requirements. Where conditions are favorable to the use of double-caution indications, enginemen may be given valuable information to assist in the proper control of their trains providing they are first taught to observe signal indications strictly.

V. P. 33.—The use of two caution signals is no more consistent than the use of two stop signals. If a caution signal cannot be placed at braking distance from the stop signal, the second signal in the rear should be made to display the indication, "Approach next signal at restricted speed," as covered in the A. R. A. code.

V. P. 1.—While we do not have as large a mileage of automatic signals on our road as many others, I do not recall any instance where the spacing of the home signals is less than braking distance apart, and as a general thing, therefore, I do not see that overlapping is necessary.

V. P. 34.—I am inclined to agree with the previous speaker. In practically all cases the difficult situations which have been referred to can be taken care of by the proper location of signals, and if necessary, the rearrangement of tracks or other facilities. Proper results may not always be obtained by designing a signal system to fit existing facilities, but there is no reason why, in many instances, the facilities cannot be rearranged to fit the desirable signal system.

V. P. 43.—There is undoubtedly truth in the statement that a rearrangement of tracks and facilities will solve some problems in the protection of traffic more easily than adding safeguards in the signal system. It is a very difficult matter to rearrange crowded interlockings in terminal areas, however, and it has been my experience that in such territory there are frequent cases where the first distant signal in the rear of a home is less than braking distance from it. It is our invariable practice in such cases to carry back the distant indication to the second signal in the rear. It would also be impossible to effect any rearrangement on dense-traffic high-speed suburban lines where the blocks must be kept of a shorter length than braking distance.

PRESIDENT.—We have heard many conflicting opinions, and while it seems evident that the majority do not consider the overlapping of signal circuits to be the ideal system, some hold tenaciously to the view that the overlapping at least of the caution indication is justified under special conditions. It will be interesting to know what measures are relied upon by those who do not admit the necessity of overlapping for the prevention of collisions in case an engineman over-runs a stop signal.

PREVENTING COLLISIONS WITHOUT OVERLAPS

V. P. 4.—We safeguard against rear collisions just beyond home signals by placing the responsibility for such collisions solely up to one man—the engineer. Our rule 505 reads as follows: "An engineer of a train entering a block as provided by block signal rules 504, 505-a and 504-b will be held responsible in case of accidents caused by meeting an opposing or by overtaking a preceding train by an open switch or by obstructed or broken tracks." Our rules make it plain that the train must be stopped before reaching the stop signal. We believe that maintaining strict discipline is better than providing overlaps. We believe further that overlaps are a trap for the engineman, for by their use we say to him when the signal indicates stop: "You must stop before reaching it, but if you do not, nothing will happen because we have provided protection for you in case you run by the signal." With distant signals and no overlaps, we tell the engineman that having the advance information he must stop before reaching the home signal or pay the penalty. Consequently, he stops and there is no penalty to pay.

V. P. 5.—If a following train observes the stop indication it is not material whether the distance between the signal and the rear end of a preceding train is long or short. What is needed is absolute observance of the stop signal. It is not material for what cause the signal appears at stop. It may be due to defective apparatus, and the track may be in perfect condition for the following train to proceed, nevertheless the stop must absolutely be made. The moment you permit trains to ignore the stop indication for any cause or at any speed, you introduce a dangerous condition because it is only a question of time when this bad practice will result in a train passing a signal with a track obstruction close ahead. The theory of overlapping blocks is predicated on trains running by signals in the stop position and in practice the overlap begets that careless condition.

V. P. 19.—In common with many other roads we use surprise tests extensively in insuring the proper observance of signals. Our rule governing the observance of caution signals is as follows: "Enginemen finding a distant signal at caution must immediately bring their trains under control and be prepared to stop before reaching the home signal." In checking them on the observance of signals, we make no exceptions and no allowances for an engine at any time under any circumstances to go beyond the home signal at stop. We undertake to instill thoroughly in the minds of all our engineers that a caution signal means that the train must be immediately brought under control prepared to stop before reaching the next signal.

V. P. 26.—We have a rule which is somewhat special on this point and might be of interest to others. It reads as follows: "Trains must not stand on curves or at a point where the view is obstructed where it can be avoided. When a train enters a block controlled by automatic signals and is stopped for reasons other than signal indication, if it is known that the train cannot be advanced so that the rear end will stand at least 1,000 ft. beyond the home signal, the rear of the train should not be moved clear of the home signal. If, however, the rear of the train is moved clear of

the home signal, it must advance as far as possible in the block."

V. P. 35.—We have also tried to make our rule for the observance of distant signals very concrete. The instructions to the enginemen and trainmen are as follows: "Reduce speed at once and proceed with caution."

V. P. 9.—The most satisfactory method we have ever found of educating our men in the aspects and indications of the signals, is the use of an instructor. This man, traveling in a signal instruction car, is on the road constantly, informing our men as to how they can and must control their trains to secure the greatest good as well as the greatest protection from the information given by the signals. This education has not only given the men a better understanding of the signals and their meanings than can be obtained either from the book of rules or from the explanations ordinarily given by the officers, but also has given the men absolute confidence in the signals.

V. P. 28.—It is our opinion that the bad wrecks which have occurred on account of over-running home signals at stop are not so much the result of improper signaling, as of the improper observance of the caution indication. The elimination of the "proceed with caution" indication in the recently adopted A. R. A. code rules is a decided step away from safe practice. The retention of this indication and the strict observance of it by enginemen will effect a cure, and a revision of the code rules to recognize this most important indication in the same simple every-day language that we all have known for many years and that all can understand, is earnestly waited for.

I. C. C.—In the consideration of numerous train accidents brought before the Interstate Commerce Commission, I have given the subject of overlapping automatic signals considerable study. I have been very much interested in the discussion, and as a visitor, would like to say a few things: First, it should be emphasized that the overlap is not a new thing in signaling. It is one of the oldest principles in the art. As has been clearly brought out in the discussion, it has been largely done away with in general practice and is now used principally for special conditions. The roads, as a whole, however, have not entirely eradicated the idea of giving enginemen a second chance. We are all doubtless agreed on the principle that we should stand firmly on the ground of absolute obedience to signal indications properly given. Any deviation from this course means disaster. I confess, however, that it is somewhat difficult to be inflexible in this position in the face of repeated collisions on roads with good signal installations and with discipline which is apparently as near perfect as it can be made. It should be pointed out further, that the use of the overlap to meet this condition is only a half-way measure. As one officer has stated, there is no assurance that if a man passes the signal at stop he will not also pass the end of the overlap. Whether we are willing to admit it or not, the only remedy which strikes directly at the root of this evil is the automatic stop. I appreciate fully the difficulties of perfecting such automatic devices for general service, but I am convinced that the roads of the country must bend every energy toward an early development of some such device if they are to meet squarely the responsibility resting on them in this matter.

V. P. 33.—With all due regard to the former speaker, I cannot agree with him. From the standpoint of an operating officer it is evident that a greater return may be secured in the elimination of accidents and in safeguarding the movement of trains, by extending automatic block signals rather than by providing overlaps or compelling the introduction of train control devices.

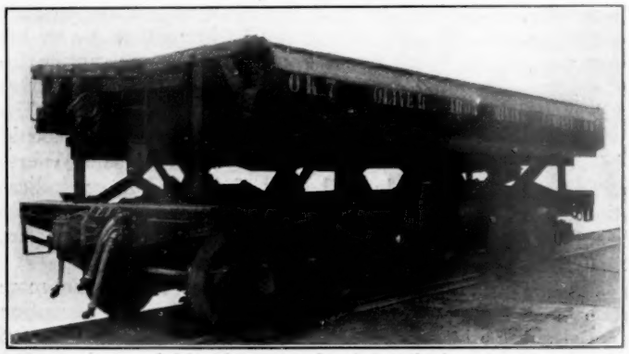
V. P. 2.—In agreeing with the last speaker I would point out that in my opinion if signal systems are properly installed with caution indications at a sufficient braking distance from the stop signals, and if the rules are strictly observed, the results will be as near perfect as human ingenuity can make them.

PRESIDENT.—If there is no further discussion, the subject is closed. As we hoped, many diverging opinions have been brought out. There would be no good purpose gained in taking action on the matter, but I am sure we have all been profited by the exchange of opinions and each of us can form our own conclusions and act upon them.

AN AUTOMATIC AIR DUMP CAR

Among interesting developments in heavy and high capacity dirt and rock handling equipment may be mentioned the automatic air operated steel dump cars built by the Orenstein-Arthur Koppel Company of Koppel, Pa. The illustrations show cars of the Missabe type built for the Oliver Iron Mining Company according to Master Car Builders' and Interstate Commerce requirements. These cars are entirely automatic, being operated by compressed air from pump and operating valves on the locomotive. They may be operated individually from each car and may be dumped all to one side or part to one side and part to the other.

The body of each car is held in its normal load-carrying position by a locking device and supported in this position by bolsters which hold the body securely in four places. There are two dumping cylinders located in the middle of each car, one on each side of the center sill. When air is admitted to the cylinder for dumping, the first few inches



Car in Upright Position

of travel of the piston releases the locking device on one side of the car, and the further travel of the piston dumps the body. A distinctive feature is the automatic air cut-off controlled entirely by the movement of the body. When the load is heaped to one side or when other conditions make the dumping easy, very little air is required to operate this car, and cases have been noted where the car was dumped and the air shut off before the piston made one-half its travel. The saving in air thus afforded eliminates the necessity for individual air reservoirs on the cars.

Another feature is the locking device which projects outside the body bolsters, where it is open to easy inspection and is free from danger of becoming inoperative because of snow, ice, dirt, etc. All valves are standard Westinghouse plug cocks proof against freezing weather, and possibility of accidental dumping from leaky valves is eliminated through a construction which holds the cylinder cocks wide open at all times when the bodies are in the normal load carrying position.

LONDON'S COAL.—The amount of coal brought to London during the first five months of 1914 was: Rail-borne, 3,369,518 tons; and sea-borne, 3,657,090 tons. During the corresponding period for 1917 it was 4,571,306 tons rail-borne, and 2,560,082 tons, sea-borne.

CONVERSION OF CONSOLIDATION TYPE LOCOMOTIVES TO EIGHT-WHEEL SWITCHERS

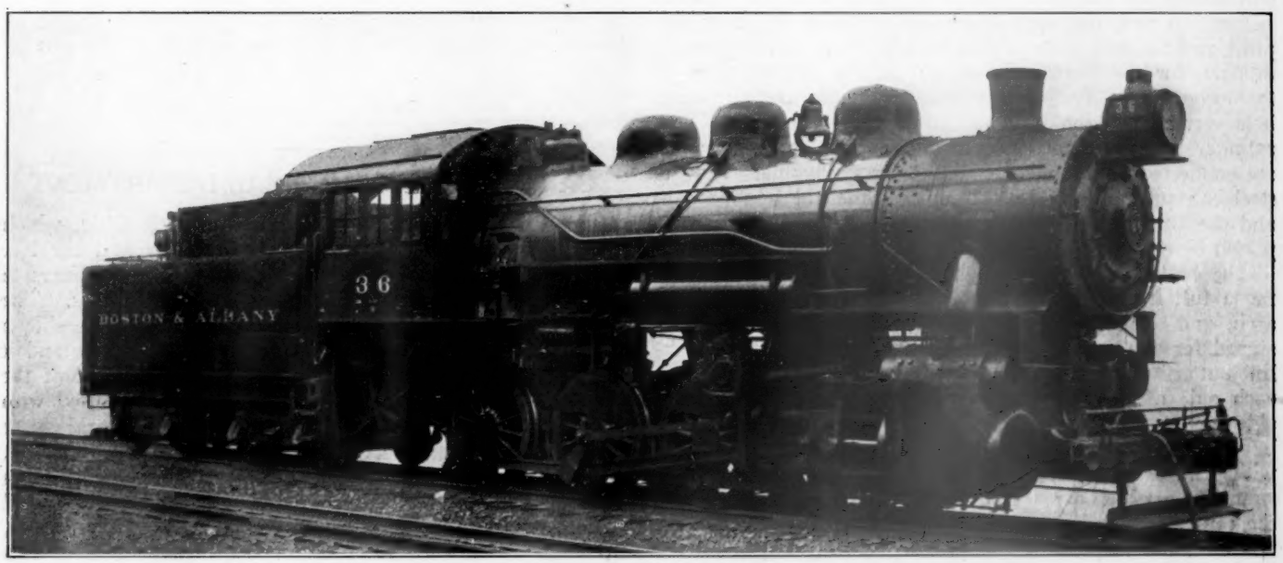
By F. J. Carty

Mechanical Engineer, Boston & Albany, Boston, Mass.

Because of heavy freight traffic in the early part of 1916, and because of the increase in train loads, it became apparent that more powerful switching locomotives were required on the Boston & Albany to handle quickly and efficiently the heavy trains brought to terminal yards by Mallet and Mikado type locomotives. In order to switch such trains properly, it is essential that the switching locomotive have a tractive effort at least equal to that of the road locomotives, and the design should permit of quick operation.

A study of the governing conditions convinced us that it would be difficult to develop a six-wheel switcher which would satisfactorily meet the requirements of the service, and it was therefore decided to build switchers of the eight-wheel type having adequate tractive effort without excessive axle loads. As the cost of materials entering into the construction of locomotives was much above normal prices, we found that a considerable saving could be made by converting Consolidation type locomotives into 0-8-0 type switchers.

The Consolidation locomotives selected were built in 1901, having a tractive effort of 37,190 lb., 20-in. by 32-in. cylinders and 57-in. driving wheels, and experience had shown that the locomotives were not sufficiently powerful to haul a satisfactory tonnage at scheduled speeds in freight service. Upon inspection, it was found that the frames, rods driving wheels and many minor parts could be utilized in the reconstruction of the locomotives into an 0-8-0 type. The mechanical department was authorized to prepare designs and begin the work of converting 12 locomotives at West Springfield shops.



Boston & Albany Eight-Wheel Switcher Converted from a Consolidation Type Freight Locomotive

The elimination of the engine truck with the consequent increase in the weight on driving wheels made it necessary to provide larger cylinders to obtain a properly proportioned and efficient locomotive. It was decided to apply 23-in. by 32-in. cylinders of the outside steam pipe design, a new boiler with a superheater, outside valve gear and Ragonnet power reverse gear. A practically new, modern switching locomotive was thus produced adaptable to the requirements of service prevailing in Boston & Albany terminal yards. In order to utilize as much as possible the old frames and running gear, the driving wheel base was maintained at 17 ft., but it was necessary to cut off the front section of the frames because of the removal of the engine truck.

These changes in design made it necessary to recalculate the "live" loads in order to bring the center of gravity of the locomotive in a vertical plane midway between the main and intermediate drivers. It may be of interest to outline the method followed to determine the correct position of the boiler.

The "dead" loads, consisting of driving wheels, engine truck wheels, boxes, cellars, bearings, axles, crank pins, eccentrics and the proportionate weights of main and side rods, were assumed to be concentrated at each axle. One-third the weight of the main rod, and one-half the weight of the eccentric blades were assumed to be carried at the main driving wheels. Subtracting the dead loads from the known distributed weights gives the live load at each wheel.

By taking any convenient point as an axis of moments, such as the center of the engine truck axle, and multiplying the live load at each wheel by the distance of the load from the selected axis, the location of the center of gravity of all parts of the locomotive, other than those considered as dead loads, is determined. The next step is to find the location of the center of gravity of the live load with the engine truck removed, making the proper allowance for increased weight due to the larger cylinders, the outside valve gear, the superheater, changes in the smokebox and bumper castings. In this computation, the entire weight of the superheater header and units was considered as concentrated at the front flue sheet. The center of gravity of the live load was 6 in. ahead of the plane midway between the main and intermediate driving wheels.

After determining the location of the center of gravity of the live load with engine truck removed, the weight of the boiler with two gages of water, and the center of gravity of the boiler and water should be found. In this calculation it is convenient to divide the boiler into four parts: the smokebox, first course, second course, and firebox. The weight of each of the four sections is assumed to be concentrated at the geometric center of each section. By taking moments about any convenient axis, such as the smokebox front, the center of gravity of the boiler and water may be calculated and it will then be possible to determine the weight and location of the center of gravity of what we may term the machinery of the locomotive.

Knowing the weight and location of the center of gravity of the boiler and of the machinery, we can at once compute the number of inches the boiler must be moved towards the rear in order to bring the center of gravity of the locomotive midway between the main and intermediate wheels. It is important that this be done in order to insure correct distribution of the load between the four pairs of driving wheels, and it is also essential that special attention be given to the design of the equalizing rigging. We have used the latest type of equalizer arrangement with transverse equalizer at the forward end of the locomotive.

It was found that in order to compensate for the removal of the engine truck and the changes outlined, the boiler should be moved towards the rear 14¼ in. and the new boiler was designed to meet this condition.

Owing to the use of outside steam pipes with the new cylinders, a new single rail front frame section was necessary on the converted locomotives. The old frames were cut at the front pedestal jaws and the new cast steel front sections welded on by the thermit process. The frames are unusually well re-enforced, and on account of the increase in power of the eight-wheel locomotive, as compared with the Consolidation locomotive, we considered it advisable to apply a stronger type of pedestal binder, replacing the old thimble type by cutting off the lower part of the pedestals, and filling up the bolt holes with the aid of the electric welder. A new cast steel front bumper beam has been applied and the foot plate is particularly heavy to compensate, in part, for the increase in weight at the forward part of the locomotive. The driver brake cylinders are supported in a vertical position from the guide yoke crosstie and new cylinder levers, proportioned to give correct braking power, are connected to the old foundation brake rigging. A wide steel cab substantially braced replaces the old wooden cab, and the air reservoirs and running boards are securely supported by cast steel brackets, bolted to the boiler.

The boiler is of the straight top radial stay type, having a full installation of Tate flexible bolts, Security brick arch, and a single 14-in. by 20-in. fire door opening, designed for a pneumatically operated fire door of the Franklin butterfly type. There are four combustion tubes in each side of the firebox. As the two rear tubes on each side come within the cab, we have protected the enginemen by covering over the outer ends of the combustion tubes with 2-in. pipes which extend down to and through the cab running board and are arranged so that the air flowing into the combustion tubes is drawn from outside the cab.

Two sand boxes are located on top of the boiler and the locomotive has the usual specialties: Pneumatic sanders, bell ringer, cylinder cock operating mechanism, Hancock type E injectors, Consolidated safety valves, Everlasting blow-off valve, King type packing and a special type of exhaust pipe which modifies the noise of the exhaust. The Radial buffer is provided between the locomotive and tender to facilitate the removal of drawbar for inspection and the power reverse gear is supported from the boiler by means of brackets made up of boiler plate.

The tender tank has been remodelled so as to interfere as little as possible with the view of the enginemen when the locomotive is operated with tender leading. The longitudinal channel sills of the tender underframe have been re-enforced by plating and new cast steel end sills have been applied. The coupler and pocket at the rear of the tender are of the latest Sharon type, with a 3-in. pin.

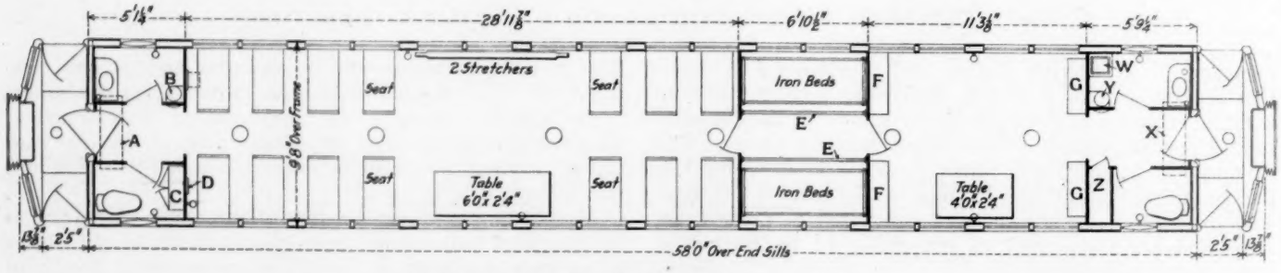
The first of the 12 locomotives to be converted has been in service a short time, and the results obtained are entirely satisfactory. The locomotive handles the cars without difficulty, starts and stops quickly, and the performance is fully up to expectations. The cost of labor and materials has advanced rapidly since work was begun, and while therefore the cost of converting the locomotives may exceed the estimates, the apparent saving compared with the cost of new locomotives of similar type is greater than was estimated on account of present abnormal prices.

A comparison of the principal characteristics of the Consolidation and the eight-wheel switcher is given below:

	Consolidation	Eight-Wheel Switcher
Cylinders, diameter and stroke, in.	20 in. by 32 in.	23 in. by 32 in.
Steam pressure, lb. per sq. in.	195	180
Tractive effort, lb.	37,190	45,440
Grate area, sq. ft.	50.3	50.3
Heating surface, sq. ft.	3,135	2,174
Superheating surface, sq. ft.	None	472
Tubes, number of 2-in.	359	175
Tubes, number of 5½ in.	None	26
Tubes, length	16 ft.	16 ft.
Superheater	None	Schmidt
Valve gear	Stephenson	Baker
Reverse gear	Hand-operated	Ragonnet
Wheel base	25 ft.	17 ft.
Weight drivers, lb.	163,000	193,000
Factor of adhesion	4.4	4.25
Tender, tons coal	10	10
Tender, gallons water	5,000	6,000

CAR FOR B. & O. MEDICAL DEPARTMENT

The Relief Department of the Baltimore & Ohio, which includes the medical department, has recently had car No. 4178 fitted up for the convenience of traveling examiners in making physical examinations of telegraph operators. The plan and arrangement of the interior of the car are shown in the drawing. Its length is 58 ft. over the end sills and it is carried on eight wheels. The main compartment of the car, 29 ft. long, is called a coach section and is fitted with double seats, as shown in the drawing. The central space in this compartment has a table and a number of chairs. Next to the transverse partition at the right is the sleeping room in which are two double deck single iron beds; and beyond the next partition is the lounging room, 11 ft. 3⅛ in. long. The shelves, *F*, *G*, in the four corners of this room are fitted with curtains in the front and also at the ends.



Baltimore & Ohio Medical Examiners' Car

A, Water tank overhead; size 14 in. by 46 in. B, Y, Drinking water. C, Locker. D, Eye-testing cabinet. E, E, Curtain rods. F, F, Shelf; hooks beneath. G, G, Three shelves each side; space below for suit case. W, Gas stove. X, Water tank overhead. Z, Linen locker.

The lamps fixed along the center of the car, overhead, as indicated by the circles, are gas, and five of the bracket lamps at the sides of the room are gas; the other four brackets support oil lamps, put in for emergency use.

The doors as well as the windows are screened to keep out flies. Other features of the car are indicated in the notes beneath the drawing.

Steam Railway Statistics to June 30, 1916

Interstate Commerce Commission's Annual Abstract of the Year's Operations. Large Increases in Traffic

THE Interstate Commerce Commission has issued its abstract of statistics of railway operation for the fiscal year ended June 30, 1916, based on compilations for its twenty-ninth annual statistical report. Returns of switching and terminal companies are not included. Advance figures given in this abstract may be slightly modified by revision before final publication. Class I roads are those having annual operating revenues above $1,000,000; Class II roads are those having annual operating revenues from $100,000 to $1,000,000; and Class III roads are those having annual operating revenues below $100,000.

Mileage

On June 30, 1916, the roads covered by this abstract represented 259,210.86 miles of line operated, including 11,856.42 miles used under trackage rights. The aggregate mileage of railway tracks of all kinds covered by operating returns for these roads was 394,944.26 miles, classified as follows:

Item	Roads			
	Class I	Class II	Class III	Total
Miles of road	231,263.98	18,913.68	9,033.20	259,210.86
Miles of second main track	28,732.50	195.84	6.87	28,935.21
Miles of third main track	2,725.58	5.04	.....	2,730.62
Miles of fourth main track	1,960.00	.....	.....	1,960.00
Miles of all other main tracks	238.34	.....	.....	238.34
Miles of yard track and sidings	97,198.95	3,716.75	953.53	101,869.23
Total, all tracks	362,119.35	22,831.31	9,993.60	394,944.26

The increase in mileage of all tracks for the year was 3,802.75 miles. Of this 1,641.54 miles were in single or first track, and 1,959.07 miles in yard track and in sidings.

Equipment

There were 63,862 locomotives in service on June 30, 1916, as follows:

Kind of locomotive	Roads			
	Class I	Class II	Class III	Total
Steam	60,790	1,928	860	63,578
Other	267	14	3	284
Total	61,057	1,942	863	63,862

The total number of cars was 2,478,159, including passenger service, 54,664; freight service 2,326,987; company service, 96,508. These figures do not include so-called private cars.

Of the cars in freight service, exclusive of caboose cars, 2,298,263 were classified as shown in the table.

Item	Class I roads		Class II roads		Class III roads		Total	
	Number	Aggregate capacity *Tons*	Number	Aggregate capacity *Tons*	Number	Aggregate capacity *Tons*	Number	Aggregate capacity *Tons*
Box cars	1,014,219	36,582,648	9,015	276,252	1,184	28,205	1,024,418	36,887,105
Flat cars	120,393	4,505,486	12,783	386,396	3,543	99,495	136,719	4,991,377
Stock cars	82,123	2,652,574	1,294	36,752	70	1,307	83,487	2,690,633
Coal cars	875,316	41,244,672	22,904	998,558	1,418	56,057	899,638	42,299,287
Tank cars	9,462	380,092	249	7,156	117	3,928	9,828	391,176
Refrigerator cars	51,610	1,669,462	130	3,355	6	150	51,746	1,672,967
Other freight-train cars	83,189	3,731,160	6,826	232,703	2,412	49,127	92,427	4,012,990
Total	2,236,312	90,766,094	53,201	1,941,172	8,750	238,269	2,298,263	92,945,535

Employees

Class I, Class II, and Class III roads, operating 258,669.75 miles of line, reported 1,654,075 as the average number of employees in their service during the year. The total compensation reported was $1,403,968,437. Because of a change in classification, the figures for 1916 are not comparable with figures relating to 1915.

Capitalization of Railway Property*

On June 30, 1916, according to reports of operating roads and their nonoperating subsidiary lines, the par value of railway capital was $21,092,372,245. This includes capital securities held by the railway companies concerned, as well as by the public. Of the total there existed as stock, $9,058,982,733, and as funded debt, $12,033,389,512.

Capital Actually Outstanding on June 30, 1916

Class	Total capital	Stock, thousands			
		Total	Common	Preferred	Debenture
Class I	$16,101,172,989	$6,918,712	$5,672,039	$1,230,948	$15,723
Class II	655,174,740	375,699	345,401	30,296	1
Class III	153,758,362	97,289	91,876	5,412	.....
Nonoperating	2,771,387,001	1,351,705	1,209,893	141,611	200
Total	$19,681,493,092	$8,743,406	$7,319,211	$1,408,270	$15,924

Capital Outstanding—Continued

Class	Funded debt, thousands				
	Mortgage bonds	Collateral trust bonds	Income bonds	Miscellaneous obligations	Equipment obligations
Class I	$6,779,054	$931,984	$234,995	$903,385	$333,041
Class II	258,903	588	8,325	5,094	6,563
Class III	53,143	112	2,300	462	450
Nonoperating	1,187,644	57,440	23,167	140,503	10,925
Total	$8,278,744	$990,125	$268,789	$1,049,446	$350,980

Capital Outstanding—Continued

Class	Total funded debt
Class I	$9,182,460,670
Class II	279,475,456
Class III	56,468,563
Nonoperating	1,419,681,764
Total	$10,938,086,453

Capital Nominally Issued or Nominally Outstanding

Class	Total capital	Stock, thousands			
		Total	Common	Preferred	Debenture
Class I	$1,301,170,117	$264,143	$234,129	$29,994	$20
Class II	60,039,344	32,402	32,206	195	.....
Class III	7,737,383	2,062	2,038	24	.....
Nonoperating	41,932,309	16,968	15,638	1,329	.....
Total	$1,410,879,153	$315,576	$284,012	$31,543	$20

Nominal Capital—Continued

Class	Funded debt, thousands				
	Mortgage bonds	Collateral trust bonds	Income bonds	Miscellaneous obligations	Equipment obligations
Class I	$919,040	$71,365	$13,814	$8,919	$23,886
Class II	26,898	450	178	110	.....
Class III	5,570	5	100	.....	.....
Nonoperating	24,291	184	395	92	.....
Total	$975,801	$72,004	$14,488	$9,122	$23,886

Nominal Capital—Continued

Class	Total funded debt
Class I	$1,037,026,827
Class II	27,637,294
Class III	5,675,363
Nonoperating	24,963,575
Total	$1,095,303,059

* As covered by these statements, "Actually issued" securities are those which have been sold for a valuable consideration to bona fide purchasers who hold them free from control by the issuing company. Securities actually issued and not reacquired by or for an issuing company are considered to be "actually outstanding." "Nominally issued" securities are those which have been signed and sealed and placed with the proper officers for sale and delivery or are pledged or otherwise placed in some special fund of the issuing company. "Nominally outstanding" securities are those reacquired by or for the issuing company and held alive.

Of the total capital stock actually outstanding for the roads under consideration, $3,581,434,810, or 40.96 per cent paid no dividends. The amount of dividends declared during the year (by both operating and nonoperating companies represented in this statement) was $411,975,955, being the equivalent to 7.98 per cent on dividend-paying stock. The average rate of dividends paid on all stocks actually outstanding, pertaining to the roads under consideration, was 4.71.

Investment in Road and Equipment

The figures include returns for operating roads of Class I and Class II, and their subsidiary nonoperating roads. The expenditures for additions and betterments, as well as the expenditures for new lines and extensions, during the year, are analyzed in the following statement:

Investment to June 30, 1916 (239,392.31 miles of line represented)		$17,525,576,908	
Investment to June 30, 1915 (238,162.14 miles of line represented)		17,267,119,423	
Increase, 1916 over 1915			$258,457,485
Investment during the year:			
In new lines and extensions	$41,885,894		
In additions and betterments—			
On owned lines $222,794,954			
On leased lines 16,454,252			
	239,249,206		
Total investment during the year		$281,135,100	
Adjustments	$1,104,672		
Difference between record value of grantor and purchase price of grantee in cases of roads sold, merged, consolidated, etc.	*23,782,287*		
Total during the year		*22,677,615*	
Net increase during the year			$258,457,485

Public Service of Railways

The following table gives comparative figures for 1916 and 1915 pertaining to public service of railways and covers returns for roads having operating revenues above $100,000 for the year:

Item	Year ended June 30— 1916	1915
Number of passengers carried	1,005,683,174	976,303,602
Number of passengers carried 1 mile	34,213,596,127	32,384,247,563
Number of passengers carried 1 mile per mile of road	137,818	131,165
Number of tons of revenue freight carried, including freight received from connections	2,225,943,388	1,802,018,177
Ton-mileage, or number of tons carried 1 mile	343,099,937,805	276,830,302,723
Freight density, or number of tons carried 1 mile per mile of road	1,380,349	1,121,059
Average number of ton-miles of revenue freight per train-mile	534.95	474.45
Average receipts per passenger per mile—(cents)	2.006	1.985
Average receipts per ton per mile....(cents)	0.716	0.732
Passenger-service train revenue per train-mile	$1.38619	$1.30858
Freight revenue per train-mile	$3.82828	$3.46995
Operating revenues per train-mile	$2.80074	$2.51895
Operating expenses per train-mile	$1.83279	$1.77641
Ratio of operating expenses to operating revenues....(per cent)	65.44	70.52

Revenues and Expenses

The operating revenues for the year ended June 30, 1916, of the railways in the United States herein presented (average mileage operated, 257,982.45 miles) were $3,472,641,941, or $13,461 per mile of line operated; their operating expenses were $2,277,202,278, or $8,827 per mile of line operated. The following tables present a statement of the operating revenues in detail and a statement of the operating expenses assigned to the eight general classes:

Operating Revenues—(a) Rail; (b) Water; (c) Incidental

Item	Roads Class I	Class II	Class III	Total
Freight	$2,402,210,995	$54,721,135	$12,094,791	$2,469,026,921
Passenger	673,806,175	13,446,474	2,374,294	689,626,943
Excess baggage	6,267,466	99,039	15,287	6,381,792
Sleeping car	2,918,941	940	.....	2,919,881
Parlor and chair car	1,328,166	14,098	1,781	1,344,045
Mail	60,126,464	1,096,247	255,102	61,477,813
Express	80,871,864	1,011,570	208,101	82,091,535
Other passenger-train	5,753,940	39,395	8,156	5,801,491
Milk	15,465,779	307,491	134,600	15,907,870
Switching	36,558,669	1,809,631	233,782	38,602,082
Special service train	1,575,194	96,637	10,283	1,682,114
Other freight-train	336,223	24,876	1,537	362,636
Water transfers—				
Freight	647,651	935	.....	648,586
Passenger	1,680,553	29,827	.....	1,710,380
Vehicles and live stock	2,147,230	44,074	.....	2,191,304
Other	1,066,830	35	.....	1,066,865
Total rail-line transportation revenue	$3,292,762,140	$72,742,404	$15,337,714	$3,380,842,258
Freight	$12,837,782	$458,644	$15,100	$13,311,526
Passenger	1,410,308	252,154	21,467	1,683,929
Excess baggage	4,707	180	97	4,984
Other passenger service	56,070	5,782	.....	61,852
Mail	24,928	19,605	5,740	50,273
Express	18,511	9,537	1,999	30,047
Special service	2,350	950	.....	3,300
Other	321,270	292	4,158	325,720
Total water-line transportation revenue	$14,675,926	$747,144	$48,561	$15,471,631
Dining and buffet	$17,244,591	$3,965	.....	$17,248,556
Hotel and restaurant	5,748,929	14,057	$546	5,763,532
Station, train, and boat privileges	3,954,029	43,826	3,827	4,001,682
Parcel room	965,780	2,500	58	968,338
Storage—Freight	2,785,305	41,666	8,449	2,835,420
Storage—Baggage	641,860	4,001	414	646,275
Demurrage	14,353,124	592,480	86,594	15,032,198
Telegraph and telephone	1,772,337	71,957	14,447	1,858,741
Grain elevator	1,773,399	.....	.....	1,773,399
Stockyard	1,435,058	54	.....	1,435,112
Power	2,065,377	67,358	731	2,133,466
Rents of buildings and other property	4,464,158	279,696	55,702	4,799,556
Miscellaneous	14,701,837	721,294	146,250	15,569,381
Total incidental operating revenue	$71,905,784	$1,842,854	$317,018	$74,065,656
Joint facility—Cr	$3,598,814	$42,339	$6,140	$3,647,293
Joint facility—Dr	*1,344,798*	*39,966*	*133*	*1,384,897*
Total joint facility operating revenue	$2,254,016	$2,373	$6,007	$2,262,396
Total railway operating revenues	$3,381,597,866	$75,334,775	$15,709,300	$3,472,641,941
Railway Operating Expenses				
Maintenance of way and structures	$404,514,144	$12,892,387	$4,094,367	$421,500,898
Maintenance of equipment	557,664,332	10,582,293	2,079,782	570,326,407
Traffic expenses	60,633,984	1,341,869	227,244	62,203,097
Transportation expenses —Rail line	1,080,797,803	24,032,524	5,395,133	1,110,225,460
Transportation expenses —Water line	9,302,391	651,335	25,696	9,979,422
Miscellaneous operations	25,249,704	212,426	11,822	25,473,952
General expenses	79,192,476	3,558,788	1,211,396	83,962,660
Transportation for investment—Cr.	*6,462,048*	*24,149*	*8,754*	*6,494,951*
Total railway operating expenses	$2,210,892,786	$53,247,473	[1]$13,062,019	[1]$2,277,202,278

[1] Includes $25,333, unclassified.

Income Account and Profit and Loss Account

The income present for the year ended June 30, 1916, the condensed income account and the profit and loss account of the operating roads and of their subsidiary nonoperating roads. The figures include such intercorporate payments as may be involved in the items stated. Returns for a few small roads have been omitted because of incompleteness. The accounts of the operating roads include both operating and financial transactions, while the accounts of the nonoperating roads are confined for the most part to receipts and payments under leases, contracts, and agreements. For a number of items, such as dividends, taxes, etc., figures for all roads must be taken into consideration in order to learn the aggregates of such items for the classes of railway companies represented.

INCOME ACCOUNT

Item	Operating roads: Class I roads	Class II roads	Class III roads	Total operating roads	Nonoperating roads: Subsidiary to Class I roads	Subsidiary to Class II roads	Subsidiary to Class III roads	Total nonoperating roads
OPERATING INCOME								
Railway operating revenues	$3,381,597,866	$75,334,775	$15,709,300	$3,472,641,941	.....	.....	.....	.....
Railway operating expenses	2,210,892,786	53,247,473	13,062,019	2,277,202,278	.....	.....	.....	.....
Net revenue from railway operations	$1,170,705,080	$22,087,302	$2,647,281	$1,195,439,663	.....	.....	.....	.....
Railway tax accruals	$145,517,034	$3,784,568	$712,939	$150,014,541	$1,569,237	$14,677	$1,386	$1,585,300
Uncollectible railway revenues	806,747	13,997	1,788	822,532	.....	.....	.....	.....
Railway operating income	$1,024,381,299	$18,288,737	$1,932,554	$1,044,602,590	*$1,569,237*	*$14,677*	*$1,386*	*$1,585,300*
Revenues from miscellaneous operations	$38,327,124	$32,418	$168,058	$38,527,600	.....	.....	.....	.....
Expenses of miscellaneous operations	32,821,503	41,196	145,669	33,008,368	.....	.....	.....	.....
Net revenue from miscellaneous operations	5,505,621	*8,778*	22,389	5,519,232	.....	.....	.....	.....
Taxes on miscellaneous operating property	2,075,769	1,878	1,618	2,079,265	.....	.....	.....	.....
Miscellaneous operating income	$3,429,852	*$10,656*	$20,771	$3,439,967	.....	.....	.....	.....
Total operating income	$1,027,811,151	$18,278,081	$1,953,325	$1,048,042,557	*$1,569,237*	*$14,677*	*$1,386*	*$1,585,300*
NONOPERATING INCOME								
Hire of freight cars—Credit balance	$14,761,360	$1,831,872	$130,904	$16,724,136	.....	.....	.....	.....
Rent from locomotives	6,334,448	230,966	55,825	6,621,239	$4,920	.....	.....	$4,920
Rent from passenger-train cars	10,536,522	87,471	9,036	10,633,029	12,360	.....	.....	12,360
Rent from floating equipment	201,553	3,712	82	205,347	.....	.....	.....	.....
Rent from work equipment	1,740,122	33,636	2,751	1,776,509	935	$75	.....	1,010
Joint facility rent income	24,586,140	1,077,696	167,266	25,831,102	516,642	.....	.....	516,642
Income from lease of road	5,204,296	520,757	13,026	5,738,079	130,976,289	196,354	$125,882	131,298,525
Miscellaneous rent income	8,167,136	275,614	18,011	8,460,761	107,881	291	1	108,173
Miscellaneous nonoperating physical property	2,831,487	57,522	10,109	2,899,118	100,273	280	.....	100,553
Separately operated properties—Profit	3,402,021	1,630	.....	3,403,651	40,837	.....	.....	40,837
Dividend income	95,089,195	230,365	1,080	95,320,640	406,037	.....	.....	406,037
Income from funded securities	44,327,083	224,555	49,837	44,601,475	2,952,865	5	.....	2,952,860
Income from unfunded securities and accounts	24,952,949	316,309	54,571	25,323,829	457,725	3,114	.....	460,839
Income from sinking and other reserve funds	2,687,560	45,258	4,425	2,737,243	548,881	.....	.....	548,881
Release of premiums on funded debt	268,286	129,599	.....	397,885	32,843	937	.....	33,780
Contributions from other companies	182,540	495,851	186,177	864,568	.....	.....	.....	.....
Miscellaneous income	2,167,129	91,723	11,479	2,270,331	219,780	7,948	297	228,025
Total nonoperating income	$247,439,827	$5,654,536	$714,579	$253,808,942	$136,378,268	$208,994	$126,180	$136,713,442
Gross income	1,275,250,978	$23,932,617	$2,667,904	$1,301,851,499	$134,809,031	$194,317	$124,794	$135,128,142
DEDUCTIONS FROM GROSS INCOME								
Hire of freight cars—Debit balance	$37,589,718	$3,006,238	$645,015	$41,240,971	$705,246	$8	.....	$705,254
Rent for locomotives	5,682,845	534,979	139,249	6,357,073	183,947	.....	.....	183,947
Rent for passenger-train cars	11,225,471	321,891	55,712	11,603,074	312,851	.....	.....	312,851
Rent for floating equipment	2,170,021	11,055	.....	2,181,076	.....	.....	.....	.....
Rent for work equipment	470,532	23,949	10,667	505,148	3,672	.....	.....	3,672
Joint facility rents	40,529,898	922,667	119,254	41,571,819	738,100	.....	.....	738,100
Rent for leased roads	139,215,095	305,649	265,828	139,786,572	951,690	.....	.....	951,690
Miscellaneous rents	5,220,362	139,608	80,020	5,439,990	318,964	60	$50	319,074
Miscellaneous tax accruals	2,408,033	29,691	4,767	2,442,491	296,192	.....	.....	296,192
Separately operated properties—Loss	2,554,349	.....	735	2,555,084	7,152	.....	.....	7,152
Interest on funded debt	399,348,125	13,382,770	2,305,992	415,036,887	58,599,583	151,784	66,750	58,818,116
Interest on unfunded debt	15,066,312	1,591,758	1,234,638	17,892,708	2,300,866	12,487	42,414	2,355,767
Amortization of discount on funded debt	2,958,935	216,398	50,209	3,225,542	239,527	850	.....	240,377
Maintenance of investment organization	359,722	6,010	.....	365,732	362,887	8,664	2,880	374,431
Income transferred to other companies	3,558,614	351,687	15,384	3,925,685	2,206,898	9,990	.....	2,216,888
Miscellaneous income charges	3,670,053	36,395	1,304	3,707,752	216,085	.....	4,198	220,283
Total deductions from gross income	$672,028,085	$20,880,745	$4,928,774	$697,837,604	$67,443,659	$183,843	$116,292	$67,743,794
Net income	$603,222,893	$3,051,872	*$2,260,870*	$604,013,895	$67,365,372	$10,474	$8,502	$67,384,348
DISPOSITION OF NET INCOME								
Income applied to sinking and other reserve funds	$11,693,194	$318,487	$37,314	$12,048,995	$796,547	.....	.....	$796,547
Dividend appropriations of income	184,044,513	1,681,286	252,009	185,977,808	40,258,804	$58,449	$19,050	40,336,303
Income appropriated for investment in physical property	51,033,749	413,639	64,444	51,511,832	1,985,333	.....	.....	1,985,333
Stock discount extinguished through income	.....	10,754	12,469	23,223	.....	.....	.....	.....
Miscellaneous appropriations of income	17,580,579	1,700	8,437	17,590,716	140,572	.....	.....	140,572
Total appropriations of income	$264,352,035	$2,425,866	$374,673	$267,152,574	$43,181,256	$58,449	$19,050	$43,258,755
Income balance transferred to profit and loss	$338,870,858	$626,006	*$2,635,543*	$336,861,321	$24,184,116	*$47,975*	*$10,548*	$24,125,593

PROFIT AND LOSS ACCOUNT

Item	Operating roads: Class I roads	Class II roads	Class III roads	Total operating roads	Nonoperating roads: Subsidiary to Class I roads	Subsidiary to Class II roads	Subsidiary to Class III roads	Total nonoperating roads
Credit balance transferred from income	$355,811,083	$7,707,411	$1,129,190	$364,647,684	$27,920,980	$49,440	$42,152	$28,012,572
Profit on road and equipment sold	2,850,939	29,039	8,360	2,888,338	94,014	.....	.....	94,014
Delayed income credits	1,095,177	212,183	56,598	1,363,958	758,743	.....	.....	758,743
Unrefundable overcharges	672,042	2,741	221	675,004	1,255	.....	.....	1,255
Donations	1,085,329	98,576	97,487	1,281,392	165,953	.....	.....	165,953
Miscellaneous credits	64,196,647	7,488,491	957,558	72,642,696	2,152,474	1,389	20,582	2,174,445
Total credits during year	$425,711,217	$15,538,441	$2,249,414	$443,499,072	$31,093,419	$50,829	$62,734	$31,206,982
Debit balance transferred from income	$16,940,225	$7,081,405	$3,764,733	$27,786,363	$3,736,864	$97,415	$52,700	$3,886,979
Surplus applied to sinking and other reserve funds	7,564,263	63,076	29,580	7,656,919	533,765	.....	.....	533,765
Dividend appropriations of surplus	97,891,858	2,484,205	264,297	100,640,360	13,687,162	20,000	21,313	13,728,475
Surplus appropriated for investment in physical property	22,545,621	286,442	34,908	22,866,971	156,091	.....	.....	156,091
Stock discount extinguished through surplus	52,814	2,217,143	7,900	2,277,857	16,900	.....	.....	16,900
Debt discount extinguished through surplus	20,074,624	393,813	4,055	20,472,492	110,002	102	.....	110,104
Miscellaneous appropriations of surplus	922,127	60,259	56,327	1,038,713	45,251	.....	3,821	49,072
Loss on retired road and equipment	20,417,850	627,493	242,727	21,288,070	757,611	238,275	14,812	1,010,698
Delayed income debits	1,566,249	1,460,959	90,110	3,117,318	615,306	.....	.....	615,306
Miscellaneous debits	52,580,010	2,011,735	677,790	55,269,535	1,049,889	2,846	69,563	1,122,298
Total debits during year	$240,555,641	$16,686,530	$5,172,427	$262,414,598	$20,708,841	$358,638	$162,209	$21,229,688
Net increase during year	$185,155,576	*$1,148,089*	*$2,923,013*	$181,084,474	$10,384,578	*$307,809*	*$99,475*	$9,977,294
Balance at beginning of year	888,965,986	*24,851,067*	*16,863,010*	847,251,909	16,705,283	*906,795*	*734,613*	15,063,875
Balance at end of year	$1,074,121,562	*$25,999,156*	*$19,786,023*	$1,028,336,383	$27,089,861	*$1,214,604*	*$834,088*	$25,041,169

WORKMEN'S COMPENSATION LAWS

The National Industrial Conference Board, M. W. Alexander, secretary, 15 Beacon street, Boston, has issued a pamphlet of 60 pages, 6 in. x 9 in., summarizing a study which has been made of workmen's compensation laws throughout the country, and making recommendations on the legal phase of the subject. The National Industrial Conference Board represents textile manufacturers, metal trades and other large interests.

The vital principle of workmen's compensation is defined as "the substitution of a definite and certain measure of relief for the former uncertainties of redress through litigation." The new method ignores the question of fault of anyone except where it is clearly wilful, and classes industrial accidents as necessarily incidental to industrial activity. Compensation acts thus aim to meet a public necessity, not to redress a private wrong.

Thirty-seven states and four territories of the United States now have compensation laws, and a federal compensation act for civilian employees was adopted last September.

The compensation principle now applies to more than two-thirds of the wage-earners in the United States. The laws of the various states reveal curious and glaring inconsistencies. West Virginia, Michigan and California exclude traveling salesmen from compensation benefits; Minnesota includes them only if employed by a Minnesota employer; New Jersey includes them while in the state, even though they are not residents. Domestics and casual laborers are usually excluded. In numerous industries, particularly agriculture, compensation acts do not apply to the small employer. Agricultural labor is specifically included under compensation legislation by only one state, New Jersey; in 23 states it is specifically excluded.

In 8 states workmen's compensation acts are compulsory upon the employer. In 24 states he has an election, but if he does not accept, he must forfeit some or all of his common law defenses in any action brought by an injured employe. In 25 states the employer affected by compensation acts must either insure his liability or demonstrate his financial capacity for self-insurance. In several states contribution to a state insurance fund is obligatory.

Classification of "hazardous" occupations is very uncertain, and the term "accident" is variously defined. The Ohio Industrial Commission awarded compensation to the dependents of a stenographer because, while taking dictation from her employer, she was murdered by a jealous suitor; the New York Industrial Commission awarded compensation for the death of a street-railway process server from gangrenous diabetes alleged to have resulted from having his toes trodden upon by a fellow passenger in a street-railway car of the company which employed him.

In this country "occupational diseases," as a rule, are not included under the term "accident" in workmen's compensation acts, but in the administration of these acts an increasing tendency to include many forms of diseases contracted during employment is evident.

The report gives the decisions of the Supreme Court of the United States in three important cases involving workmen's compensation acts. This court has maintained the power of a State to compel contributions by employers to a state accident fund.

The report recommends that all states immediately undertake to establish a permanent, scientific, and uniform system of compiling accident statistics, and to make a clear distinction in statutes between the terms "occupational disease," "accident" and "injury." Direct settlement of claims between employer and employe is advocated. An exclusively compulsory system of compensation is endorsed on the ground that it would eliminate many technical uncertainties.

This report on the legal phase of workmen's compensation acts is to be followed by other reports on the medical, economic and administrative phases. The price of the pamphlet is one dollar.

ANTIQUATED PORT FACILITIES*

A marked lack of modern facilities for the expeditious and economical transfer of freight from cars and vessels to docks and from docks to vessels and cars, is one of the chief causes of the present congestion of freight at New York harbor, and the installation of modern cranes is an imperative duty; a duty which should be taken up by the federal government if the state and municipal authorities and the railroad and steamship lines continue to neglect to give it proper attention.

This is the conclusion of H. McL. Harding, president of the Society of Terminal Engineers, in an article published recently in the New York Journal of Commerce.

To enforce his points, Mr. Harding presents the result of comparisons which have been made at three French ports, showing the freight-transfer capacity of the docks at those ports before and after adequate apparatus had been installed. His statement, showing the annual average transferring capacity per linear yard, is as follows:

	Average of the whole port per linear yard.	Average of portion equipped.
Havre	385 tons	1,430 tons
Rouen	483 tons	1,121 tons
Marseilles	665 tons	1,694 tons

These figures are understood to cover a period in which the whole of each port was fully occupied by vessels, a part of the waterfronts having been improved and other parts left unimproved.

Some of the piers in New York are so old and poorly designed that not much improvement would be possible, but Mr. Harding thinks that on the North river water-front, from Twelfth street north to Seventy-second street, improvements might be made within a short time which would double the capacity of these piers for handling freight. The controversy between the New York Central Railroad and the city of New York over the proposed improvements on this water-front might be quickly settled, as regards the territory south of Seventy-second street; and this ought to be done. The question at issue north of Seventy-second street has to do with the permanence and the beauty of a pleasure park and can be treated as a separate problem.

Suitable improvements would not only increase the capacity of the docks in the element of celerity but would also reduce the cost per ton. The present facilities are antiquated to such an extent as to be objects of ridicule. The capacity of the piers per linear foot is not over 150 tons a year. It is easily demonstrable that, with suitable apparatus, freight can be transferred expeditiously at 18 cents a ton, as compared with a present minimum of 54.85 cents a ton; this latter figure being the result of experiments made by the United States Government at New Orleans. It is only by the use of modern cranes that the full storage capacity of piers can be utilized; suitable cranes make it practicable to pile freight higher.

FUEL ON THE RUSSIAN RAILWAYS.—The central administration of the railways has presented the Ministry of Trade and Industry with a report, according to which the demands of the Russian railways for fuel in 1917 are as follows:—Donetz coal, 23,148,000,000 lb.; Russian Asiatic coal, 7,128,000,000 lb.; petroleum, 6,624,000,000 lb.; timber, 11,900,000 cu. ft. However, as it will hardly be possible to satisfy these demands to their full extent as regards coal and liquid fuel, it has been decided to cover the deficiency by an additional supply of 17,500,000 cu. ft. of timber.

*The conditions described by Mr. Harding are well known as regards a large part of the New York water front, but it should be borne in mind that in New York harbor may be found also the great modern Bush Terminals, which are among the largest and best equipped docks in the world.

Roads Speed-Up 20 Per Cent with Less Equipment

The Railroads Are Handling from 16 to 20 Per Cent More Business With Fewer Freight Cars Than in 1915

WITH only one and four-fifths per cent more cars, railroads operating 173,105 miles of line handled 16.1 per cent more freight in May, 1917, than in May, 1916. Going back a year further it develops that the railroads of the country handled about 30 per cent more freight in May, 1916, than in May, 1915. In the year 1916 as a whole they handled 20 per cent more business than in 1915. Records of 67 of the larger roads given on the following pages show that to handle this 20 per cent more business they had not more, nor even the same, but actually 16,701 less freight cars.

Details concerning the increase in business—May, 1917, over May, 1916—are given in a statement issued last Saturday by Fairfax Harrison, Chairman of the Railroads' War Board. Mr. Harrison said:

"Gratifying indication of the extent to which the railroads of the United States are making effective their effort to produce greater transportation efficiency to aid in winning the war, is afforded by reports just received by the Railroads' War Board of freight operations during May.

"The first meeting of the War Board was held on April 23. Figures for May, the first full month following, show that the railroads rendered about 16 per cent more freight service with practically the same number of cars and locomotives as last year.

"New railroad equipment which can be made in America is now being sent to our Allies in Europe. The problem of our railroads is to handle a very great increase in freight with virtually no increase in cars, locomotives or tracks. In that effort they are not only co-operating among themselves, but are receiving splendid support from the public and the shippers.

"Actual returns now compiled are from railroads operating 173,105 miles of line. The reports show that these lines in May last year gave service equivalent to carrying 25,426,845,011 tons of freight one mile, while this year they carried 29,522,870,109 tons one mile, an increase of exactly 16.1 per cent.

"This increase in service was rendered with a very light increase in the amount of equipment used. The number of freight locomotives in service in May last year was 24,362, while this year the number was 24,483, an increase of one-half of one per cent.

"Last year in May there was 1,800,842 freight cars in service, while this year the number was 1,833,921, an increase of one and four-fifths per cent.

"A distinct mark of progress is the great reduction in the number of freight cars in the shop or awaiting repairs. Last year in May there were 113,147 cars under, or awaiting repairs, while this year only 104,061 were in that condition. Locomotives in repair, or awaiting repairs last year were 4,006 and in May this year 3,593, a reduction of 10.3 per cent.

"Last year, railroad locomotives ran an average of 65.6 miles per day, while this year they made 71.3 miles per day.

"Freight cars made an average of 28.3 miles a day in May last year, and this year 29.6 miles, an increase of five per cent. In the same period, the mileage of cars moving empty was reduced by five per cent, while the mileage of cars moving under load was increased by 9.5 per cent.

"The foregoing figures will appear all the more remarkable when it is realized that May, 1916, was itself a month of heavy traffic."

The Detailed Figures for 67 Roads

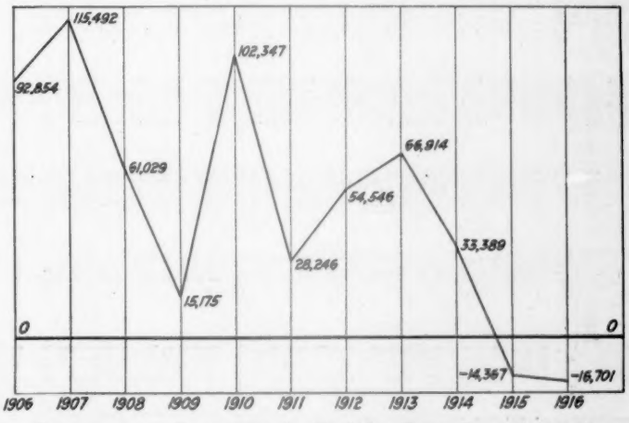
The 67 roads, mentioned above, operating 200,000 miles of line handled about 20 per cent more freight in the year 1916 than in 1915, but to do it they had not more freight cars, but actually 16,701 less cars than in 1915. The figures showing the freight equipment on these important roads will emphasize how the railroads have increased their efficiency, and they will also emphasize what has been noted so many times previously, namely, that the acquisitions of freight cars by the railroads have not been keeping pace with the demands upon them for increased service.

These comparative summaries of freight cars in service on these same railroads have been published annually in the *Railway Age Gazette* and its predecessor the *Railroad Gazette* since 1905. From 1906 to 1914 the totals always showed an increase in freight cars of from 15,000 to 115,000 annually, good times and bad, an average increase of 63,332 a year. In 1915, however, they showed for the first time a decrease of 14,367, but this year, the decrease is 16,701.

The Freight Cars of 67 Roads

	Freight cars	Inc. or dec. over preceding year
1905	1,461,158	.....
1906	1,554,012	92,854
1907	1,669,504	115,492
1908	1,730,533	61,029
1909	1,715,358	15,175
1910	1,817,705	102,347
1911	1,845,951	28,246
1912	1,900,497	54,546
1913	1,967,411	66,914
1914	2,000,800	33,389
1915	1,986,433	—14,367
1916	1,969,732	—16,701

One of the two tables, it is true, does show an increase of 862,014 cars or 77.82 per cent over 1900, but it is worth



Increases or Decreases in Freight Cars Owned by 67 Important Roads

observing that this increase of 77.82 per cent compares with an increase of about 200 to 250 per cent in freight traffic in the same period.

The *Railway Age Gazette* has noted again and again in its columns that the railways have not been buying freight cars in as great quantities as they would like. For many months both before and after the beginning of the European War the reason was the lack of funds and the inability to raise them. The railways now have the funds, but prices have become so high that no railway can well afford to buy cars at the present figures. The best authorities agree

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1915 AND 1916

Note.—Narrow-gage cars excluded. Non-revenue cars excluded. Company freight excluded.

	Miles		Freight equipment				Per cent of change	Freight cars per mile of road		Average length of haul		Freight cars: Per 1,000 frt. car miles		Freight cars: Per 1,000 rev. ton miles		Rate per ton mile (Dollars)		Frt. cars per $1,000 frt. earnings	
	1915	1916	1915	1916	Increase	Decrease		1915	1916	1915	1916	1915	1916	1915	1916	1915	1916	1915	1916
NEW ENGLAND ROADS—																			
Boston & Maine	2,302	2,252	23,410	22,834	.....	576	2.52	10.2	10.1	106.55	111.77	.111	.097	.0096	.0077	.01119	.01079	0.86	0.71
Bangor & Aroostook	631	631	5,299	5,321	22	.....	0.41	8.4	8.4	124.52	125.77	.249	.260	.0223	.0223	.01232	.01223	1.81	1.82
Central Vermont	411	411	3,001	2,953	.....	48	1.63	7.3	7.2	76.83	74.72	.114	.107	.0102	.0097	.00960	.00980	1.06	0.90
Maine Central	1,216	1,220	9,363	9,067	.....	296	0.33	7.7	7.4	93.96	96.80	.169	.154	.0143	.0124	.01097	.01060	1.21	1.17
New York, New Haven & Hartford	2,003	2,004	34,308	33,972	.....	336	0.99	17.1	16.9	91.65	87.03	.170	.164	.0157	.0138	.01434	.01528	1.10	1.01
Total	6,563	6,518	75,381	74,147	.....	1,234	1.66	11.3	11.4	96.70	99.21	.163	.156	.0144	.0132	.01168	.01174	1.21	1.14
TRUNK LINE ROADS—																			
Baltimore & Ohio	4,535	4,539	85,040	86,974	1,934	.....	2.27	18.7	19.2	201.49	195.50	.110	.102	.0065	.0055	.00546	.00560	1.20	0.98
Buffalo, Rochester & Pittsburgh	586	586	17,402	17,360	.....	42	0.23	29.6	29.6	153.83	158.23	.215	.170	.0103	.0078	.00477	.00477	2.17	1.67
Central of New Jersey	681	684	23,721	25,799	2,078	.....	8.76	34.8	37.7	71.51	70.91	.174	.172	.0105	.0097	.00948	.00947	1.11	1.03
Chesapeake & Ohio	2,369	2,375	45,291	43,654	.....	1,637	3.75	19.1	18.4	270.84	274.00	.109	.091	.0055	.0042	.00384	.00380	1.45	1.12
Delaware & Hudson	909	909	18,760	18,231	.....	529	2.90	20.6	20.0	137.32	152.48	.111	.100	.0065	.0052	.00684	.00632	0.95	0.83
Delaware, Lackawanna & Western	(1) 981	955	27,593	27,812	219	.....	.79	28.1	29.1	189.61	189.35	.094	.092	.0065	.0056	.00764	.00719	0.85	0.77
Erie	2,257	2,257	51,791	51,635	.....	156	.30	22.9	22.9	214.25	220.26	.089	.083	.0060	.0053	.00590	.00584	1.02	0.90
Lehigh Valley	1,442	1,441	44,974	43,359	.....	1,615	3.72	31.2	30.0	175.97	180.84	.135	.126	.0084	.0072	.00661	.00654	1.28	1.11
New York Central	5,609	5,661	129,603	131,185	1,582	.....	1.23	23.1	23.2	200.94	200.58	.098	.088	.0073	.0061	.00592	.00598	1.24	1.03
New York, Ontario & Western	568	568	6,041	6,200	159	.....	0.26	10.6	10.9	145.70	144.67	.116	.128	.0070	.0073	.00782	.00790	0.90	0.93
Pennsylvania Railroad	4,541	4,536	149,284	148,981	.....	303	.20	32.9	32.9	159.98	162.21	.114	.104	.0065	.0055	.00610	.00603	1.08	0.92
Philadelphia & Reading	1,120	1,127	39,014	39,326	312	.....	0.79	34.8	34.9	101.85	102.16	.128	.116	.0075	.0060	.00703	.00704	1.07	0.85
Western Maryland	661	676	8,816	10,415	1,599	.....	18.14	13.3	15.4	114.55	121.74	.120	.112	.0063	.0056	.00524	.00501	1.20	1.11
Total	26,259	26,314	647,330	650,931	3,601	.....	.56	24.6	24.7	164.45	167.15	.114	.114	.0073	.0062	.00636	.00627	1.19	1.01
SOUTHERN CLASSIFICATION—																			
Atlantic Coast Line	4,689	4,703	28,619	28,313	.....	306	1.08	6.1	6.0	166.73	174.66	.135	.126	.0163	.0132	.01203	.01835	1.35	1.22
Central of Georgia	1,924	1,924	9,907	10,318	411	.....	4.15	5.2	5.4	154.99	158.14	.144	.150	.0130	.0125	.01034	.01008	1.26	1.25
Florida East Coast	743	745	1,682	1,660	.....	22	1.33	2.3	2.2	184.69	231.30	.067	.054	.0102	.0059	.01672	.01218	0.61	0.48
Louisville & Nashville	5,037	5,042	46,710	46,423	.....	287	.62	9.3	9.2	185.51	183.49	.128	.114	.0090	.0071	.00718	.00686	1.26	1.04
Mobile & Ohio	1,122	1,122	11,422	11,129	.....	293	2.63	10.2	9.9	230.03	233.51	.099	.107	.0078	.0070	.00627	.00626	1.25	1.11
Nashville, Chattanooga & St. Louis	1,231	1,231	9,975	10,110	135	.....	1.35	8.1	8.2	154.78	161.76	.133	.126	.0136	.0113	.01019	.01009	1.33	1.12
Norfolk & Western	2,042	2,059	46,973	47,004	31	.....	0.01	23.0	22.8	272.18	265.83	.100	.082	.0052	.0040	.00410	.00420	1.28	0.95
Norfolk Southern	860	863	3,277	3,277	.....	.....	.....	3.8	3.8	87.32	98.25	.215	.166	.0198	.0133	.01514	.01289	1.31	1.04
Seaboard Air Line	(3) 3,334	3,449	17,951	17,597	.....	354	2.01	5.3	5.1	157.45	173.45	.132	.115	.0133	.0104	.01087	.01002	1.22	1.04
Southern Railway	7,031	7,022	47,130	41,855	.....	5,275	12.60	6.7	6.0	162.41	166.94	.119	.098	.0112	.0083	.00962	.00930	1.16	0.89
Virginian	504	505	7,929	7,702	.....	227	2.95	15.7	15.2	361.43	363.24	.133	.102	.0053	.0040	.00343	.00340	1.56	1.19
Total	28,519	28,665	231,575	225,388	.....	6,187	2.74	8.1	7.9	192.50	200.96	.128	.113	.0113	.0088	.00963	.00942	1.23	1.03
CENTRAL CLASSIFICATION—																			
Chicago, Indianapolis & Louisville	621	622	6,741	6,400	.....	341	5.33	10.8	10.3	128.80	137.73	.163	.139	.0120	.0088	.00765	.00719	1.57	1.22
Cincinnati, Hamilton & Dayton	1,011	780	8,592	6,073	.....	2,519	41.48	8.5	7.8	125.30	122.58	.106	.077	.0058	.0035	.00494	.00475	1.19	0.75
C. C. C. & St. Louis	2,385	2,387	30,989	29,510	.....	1,479	5.00	13.0	12.4	173.30	169.40	.094	.082	.0065	.0050	.00557	.00556	1.17	0.91
Grand Rapids & Indiana	575	575	2,978	3,041	63	.....	2.12	5.2	5.3	91.70	95.42	.095	.092	.0069	.0063	.00735	.00717	0.95	0.84
Lake Erie & Western	900	900	4,669	4,628	.....	41	.85	5.2	5.1	138.07	132.31	.080	.075	.0061	.0050	.00682	.00682	0.89	0.73
Michigan Central	1,803	1,862	24,114	28,344	4,230	.....	17.54	13.4	15.2	157.00	167.00	.089	.092	.0076	.0068	.00733	.00714	1.04	0.95
New York, Chicago & St. Louis	523	523	11,341	10,317	.....	1,024	9.92	21.7	19.7	221.00	242.00	.066	.066	.0054	.0039	.00513	.00510	1.06	0.77
Pennsylvania Company	(1) 1,758	1,755	60,895	60,397	.....	498	.82	34.6	34.6	73.46	73.05	.153	.138	.0090	.0069	.00618	.00613	1.53	1.13
P. C. C. & St. Louis	(1) 1,489	1,489	29,453	29,213	.....	240	.82	19.8	19.6	119.99	120.74	.095	.086	.0064	.0054	.00624	.00616	1.03	0.88
Pere Marquette	2,314	2,251	15,916	15,106	.....	810	5.4	6.9	6.7	173.11	172.42	.104	.096	.0076	.0064	.00614	.00652	1.27	1.00
Vandalia	(1) 917	917	8,330	8,332	2	.....	.....	9.1	9.0	115.14	120.25	.100	.096	.0065	.0059	.00610	.00617	1.07	0.99
Total	14,296	14,061	204,018	201,361	.....	2,657	1.32	14.3	14.5	137.89	141.17	.104	.094	.0073	.0058	.00631	.00625	1.16	0.92
WESTERN CLASSIFICATION—																			
Atchison, Topeka & Santa Fe	11,136	11,271	63,297	64,229	932	.....	1.47	5.7	5.7	316.68	315.61	.085	.079	.0077	.0065	.00974	.00929	0.79	0.70
Chicago & Alton	1,050	1,052	13,604	13,464	.....	140	.10	12.9	12.8	182.51	189.25	.117	.104	.0095	.0075	.00641	.00618	1.48	1.21
Chicago & Eastern Illinois	1,282	1,234	25,078	24,928	.....	150	.60	19.6	20.2	153.31	153.44	.212	.188	.0128	.0106	.00530	.00530	2.44	2.00
Chicago & North Western	8,108	8,108	67,401	65,873	.....	1,528	2.32	8.3	8.1	153.87	144.66	.130	.116	.0108	.0089	.00840	.00814	1.30	1.09
Chicago, Burlington & Quincy	9,339	9,368	65,514	65,467	.....	47	.07	7.0	7.0	268.51	275.31	.100	.092	.0077	.0065	.00733	.00710	1.05	0.91
Chicago Great Western	1,428	1,455	10,978	10,686	.....	292	2.73	7.7	7.3	244.30	257.45	.105	.099	.0080	.0070	.00700	.00684	1.14	1.02
Chicago, Milwaukee & St. Paul	10,053	10,130	61,958	61,495	.....	463	.75	6.2	6.1	248.37	262.13	.089	.080	.0076	.0061	.00781	.00757	0.97	0.81
Chicago, Rock Island & Pacific	8,330	8,098	44,247	46,292	2,045	.....	4.62	5.3	5.7	242.53	239.70	.094	.096	.0081	.0079	.00870	.00870	0.93	0.91
Chicago, St. Paul, Minneapolis & Omaha	1,753	1,753	11,388	12,662	1,274	.....	11.19	6.5	7.2	151.93	156.61	.114	.110	.0085	.0080	.00860	.00814	0.99	0.98
Colorado & Southern	1,828	1,841	12,082	11,902	.....	180	1.54	6.6	6.5	152.48	160.28	.161	.150	.0123	.0100	.01013	.00958	1.21	1.05
Denver & Rio Grande	2,571	2,572	16,431	16,060	.....	371	2.03	6.4	6.2	132.80	132.66	.176	.157	.0122	.0096	.01186	.01092	1.03	0.88
Duluth, S. S. & Atlantic	627	603	3,055	2,972	.....	83	2.79	4.9	4.9	77.55	81.17	.183	.160	.0147	.0106	.00872	.00823	1.69	1.20
Great Northern	8,061	8,052	55,779	56,079	300	.....	.54	6.9	7.0	246.18	269.98	.147	.113	.0097	.0072	.00817	.00770	1.18	0.93
Illinois Central	4,770	4,767	63,863	61,593	.....	2,270	3.69	13.4	12.9	240.25	243.11	.116	.102	.0085	.0072	.00548	.00546	1.55	1.33
Kansas City Southern	836	836	5,148	4,894	.....	254	5.19	6.2	5.9	287.81	267.90	.071	.067	.0046	.0045	.00692	.00744	0.67	0.60
Minneapolis & St. Louis	1,646	1,646	7,162	7,483	321	.....	4.48	4.4	4.5	162.25	165.26	.101	.101	.0075	.0073	.00795	.00798	0.94	0.92
Minneapolis, St. Paul & Sault Ste. Marie	4,103	4,228	24,801	24,116	.....	685	2.84	6.0	5.7	192.07	209.93	.125	.104	.0097	.0068	.00772	.00740	1.25	0.92
Missouri Pacific	7,286	7,341	42,802	41,909	.....	893	2.13	5.9	5.7	248.28	240.16	.097	.094	.0075	.0067	.00769	.00772	0.98	0.87
Missouri, Kansas & Texas	3,865	3,865	24,776	23,908	.....	868	3.63	6.4	6.2	223.36	213.92	.120	.126	.0109	.0110	.00990	.00998	1.10	1.10
Northern Pacific	6,461	6,501	48,160	47,365	.....	795	1.65	7.5	7.3	293.00	334.20	.133	.101	.0093	.0067	.00849	.00793	1.10	0.85
St. Louis-San Francisco	5,252	5,255	30,068	29,602	.....	466	1.57	5.7	5.6	165.27	168.73	.127	.114	.0097	.0086	.00950	.00970	1.02	0.88
St. Louis Southwestern	1,753	1,753	13,704	13,304	.....	400	3.00	7.8	7.6	234.96	237.94	.193	.174	.0183	.0149	.01060	.01030	1.74	1.45
San Antonio & Aransas Pass	724	724	2,602	2,463	.....	139	5.64	3.6	3.4	124.89	132.84	.140	.126	.0167	.0139	.01611	.01491	1.04	0.93
Southern Pacific	10,554	10,956	48,368	45,041	.....	3,327	7.16	4.6	4.1	208.35	246.81	.092	.071	.0072	.0049	.01099	.00977	0.66	0.70
Texas & Pacific	1,901	1,944	11,101	10,839	.....	262	2.42	5.8	5.6	189.36	197.20	.092	.091	.0082	.0074	.00923	.00915	0.89	0.81
Union Pacific	7,784	7,918	37,998	36,223	.....	1,775	4.90	4.9	4.6	357.43	414.97	.078	.061	.0063	.0044	.00968	.00885	0.64	0.48
Wabash	(2) 2,519	2,519	16,764	17,056	292	.....	1.74	6.7	6.8	240.20	257.64	.060	.057	.0049	.0038	.00641	.00622	1.07	0.62
Total	125,020	125,790	828,129	817,905	.....	10,224	1.25	6.6	6.5	212.54	221.07	.121	.108	.0096	.0079	.00870	.00839	1.14	0.97
TOTAL, ALL ROADS	200,657	201,348	1,986,433	1,969,732	.....	16,701	0.84	9.90	9.78	160.82	165.91	.126	.117	.0100	.0084	.00854	.00841	1.18	1.01

NOTE—(1) 1916 figures are for year ended June 30th—December 31st not available. (2) 1915 and 1916 figures are for year ended December 31st. (3) After consolidation with Carolina, Atlantic & Western Railway.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1900 AND 1916

Note.—Narrow-gage cars excluded. Non-revenue cars excluded. Company freight excluded.

	Miles		Freight equipment		Increase	Decrease	Per cent of change	Freight cars per mile of road		Average length of haul		Freight cars—Per 1,000 frt. car miles		Freight cars—Per 1,000 rev. ton miles		Rate per ton mile (Dollars)		Frt. cars per $1,000 frt. earnings	
	1900	1916	1900	1916				1900	1916	1900	1916	1900	1916	1900	1916	1900	1916	1900	1916
NEW ENGLAND ROADS—																			
Boston & Maine	1,787	2,252	12,300	22,834	10,534	.....	85.72	6.8	10.1	66.99	111.77	.126	.097	.0146	.0077	.01440	.01079	1.02	0.71
Bangor & Aroostook	354	631	3,091	5,321	2,230	.....	72.14	8.7	8.4	89.62	125.77	....	.260	.0539	.0223	.01420	.01223	3.79	1.82
Central Vermont	513	411	2,006	2,953	947	.....	47.21	3.9	7.2	94.97	74.72	.063	.107	.0079	.0097	.00880	.00980	0.90	0.99
Maine Central	816	1,225	3,586	9,067	5,481	.....	152.84	4.4	7.4	81.11	96.80	.163	.154	.0123	.0124	.01130	.01060	1.09	1.17
New York, New Haven & Hartford	2,008	2,004	13,116	33,972	20,856	.....	159.01	6.5	16.9	85.36	87.03	.076	.164	.0097	.0138	.01451	.01528	0.67	1.01
Total	5,478	6,518	34,029	74,147	40,118	.....	117.89	6.5	11.4	83.61	99.21	.107	.156	.0197	.0132	.01264	.01174	1.49	1.14
TRUNK LINE ROADS—																			
Baltimore & Ohio	3,179	4,539	61,708	86,974	25,266	.....	40.94	19.3	19.2	194.81	195.50	.128	.102	.0068	.0055	.00412	.00560	1.96	0.98
Buffalo, Rochester & Pittsburgh	172	586	8,858	17,360	8,502	.....	95.98	18.7	29.6	136.16	158.23	.139	.170	.0097	.0078	.00470	.00477	1.99	1.67
Central of New Jersey	639	684	15,002	25,799	10,797	.....	71.97	23.4	37.7	77.88	70.91	.153	.172	.0118	.0097	.00871	.00947	1.36	1.03
Chesapeake & Ohio	1,476	2,375	17,270	43,654	26,384	.....	152.77	21.6	18.4	302.00	274.00	.082	.091	.0058	.0042	.00343	.00380	1.71	1.12
Delaware & Hudson	665	909	13,030	18,231	5,201	.....	39.91	19.6	20.0	94.46	152.48	.147	.100	.0113	.0052	.00789	.00632	1.54	0.83
Delaware, Lackawanna & Western	947	955	27,287	27,812	525	.....	1.95	28.8	29.1	151.00	189.35	....	.092	.0144	.0056	.00808	.00719	1.79	0.77
Erie	2,104	2,257	46,225	51,635	5,410	.....	11.70	21.9	22.9	194.40	220.26	.101	.083	.0089	.0053	.00559	.00584	1.60	0.90
Lehigh Valley	1,382	1,441	34,954	43,359	8,405	.....	24.05	25.3	30.0	188.08	180.84	.135	.126	.0106	.0072	.00542	.00654	1.97	1.11
New York Central	4,318	5,661	79,157	131,185	52,028	.....	65.73	18.3	23.2	170.50	200.58	.067	.088	.0071	.0061	.00413	.00598	....	1.03
New York, Ontario & Western	480	568	5,899	6,200	301	.....	51.03	12.3	10.9	142.38	144.67	.144	.128	.0121	.0073	.00816	.00790	1.49	0.93
Pennsylvania Railroad	3,716	4,536	80,385	148,981	68,596	.....	85.33	21.6	32.9	109.54	162.21	.091	.104	.0067	.0055	.00540	.00603	1.25	0.92
Philadelphia & Reading	1,000	1,127	31,824	39,326	7,502	.....	23.60	31.8	34.9	89.42	102.16	.139	.116	.0114	.0060	.00831	.00704	1.50	0.85
Western Maryland	279	676	691	10,415	9,724	.....	140.72	2.5	15.4	51.02	121.74	....	.112	.0038	.0056	.00734	.00501	0.53	1.11
Total	20,657	26,314	422,290	650,931	228,641	.....	54.14	20.4	24.7	146.28	167.15	.121	.114	.0093	.0062	.00625	.00627	1.56	1.01
SOUTHERN CLASSIFICATION—																			
Atlantic Coast Line	1,759	4,703	5,378	28,313	22,935	.....	426.46	3.6	6.0	121.90	174.66	....	.126	.0143	.0132	.01401	.01835	1.02	1.22
Central of Georgia	1,196	1,924	5,041	10,318	5,277	.....	104.68	4.2	5.4	148.86	158.14	.107	.150	.0183	.0125	.01096	.01008	1.26	1.25
Florida East Coast	.....	745	.....	1,660	1,660	.....	100.00	....	2.2	.....	231.30	....	.054	.....	.0059	.....	.01218	....	0.48
Louisville & Nashville	3,007	5,042	23,402	46,423	23,021	.....	98.37	7.7	9.2	163.00	183.49	.096	.114	.0090	.0071	.00758	.00686	1.13	1.04
Mobile & Ohio	876	1,122	5,389	11,129	5,740	.....	106.51	6.2	9.9	195.63	233.51	....	.107	.0076	.0070	.00590	.00626	1.33	1.11
Nashville, Chattanooga & St. Louis	1,189	1,231	5,328	10,110	4,782	.....	89.75	4.4	8.2	151.00	161.76	.113	.126	.0096	.0113	.00880	.01009	1.10	1.12
Norfolk & Western	1,551	2,059	18,656	47,004	28,348	.....	151.95	12.0	22.8	253.41	265.83	.085	.082	.0068	.0040	.00430	.00420	1.58	0.95
Norfolk Southern	147	863	409	3,277	2,868	.....	707.82	2.8	3.8	57.42	98.25	....	.166	.0161	.0133	.01770	.01289	0.91	1.04
Seaboard Air Line (1901)	2,604	3,449	8,339	17,597	9,258	.....	111.02	3.2	5.1	153.32	173.45	.119	.115	.0136	.0104	.01180	.01002	1.14	1.04
Southern Railway	6,306	7,022	26,814	41,855	15,041	.....	56.09	4.2	6.0	168.82	166.94	.107	.098	.0116	.0083	.00916	.00930	1.27	0.89
Virginian	.....	505	.....	7,702	7,702	.....	100.00	....	15.2	.....	363.24	....	.102	.....	.0040	.....	.00340	....	1.19
Total	18,635	28,665	98,752	225,388	126,636	.....	128.24	5.3	7.9	157.04	200.96	.105	.113	.0119	.0088	.01002	.00942	1.19	1.03
CENTRAL CLASSIFICATION—																			
Chicago, Indianapolis & Louisville	546	622	5,440	6,400	960	.....	17.64	9.9	10.3	153.00	137.73	.155	.139	.0141	.0088	.00757	.00719	1.86	1.22
Cincinnati, Hamilton & Dayton	652	780	7,838	6,073	.....	1,765	29.06	12.0	7.8	108.96	122.58	....	.077	.0122	.0035	.00610	.00475	2.00	0.75
C. C. C. & St. Louis	1,891	2,387	15,484	29,510	14,026	.....	90.58	8.2	12.4	169.30	169.40	.094	.082	.0083	.0050	.00583	.00556	1.42	0.91
Grand Rapids & Indiana	582	575	3,015	3,041	26	.....	.86	5.2	5.3	90.12	95.42	.140	.092	.0156	.0063	.00870	.00717	1.88	0.84
Lake Erie & Western	725	900	5,549	4,628	.....	921	19.90	7.6	5.1	153.51	132.31	.137	.075	.0110	.0050	.00614	.00682	1.89	0.73
Michigan Central	1,635	1,862	14,219	28,344	14,125	.....	99.34	8.6	15.2	193.50	167.00	....	.092	.0070	.0068	.00592	.00714	1.19	0.95
New York, Chicago & St. Louis	513	523	6,743	10,317	3,574	.....	53.00	13.1	19.7	297.00	242.00	.059	.066	.0055	.0039	.00478	.00510	1.16	0.77
Pennsylvania Company	1,396	1,755	43,967	60,397	16,430	.....	37.37	31.5	34.4	77.95	73.05	.177	.138	.0135	.0069	.00590	.00613	2.30	1.13
P. C. C. & St. Louis	1,407	1,489	12,884	29,213	16,329	.....	126.74	9.1	19.6	111.14	120.74	.056	.086	.0052	.0054	.00802	.00652	0.84	0.88
Pere Marquette	1,821	2,251	7,944	15,106	7,162	.....	90.16	4.3	6.7	112.64	172.42	....	.096	.0124	.0064	.00620	.00616	1.55	1.00
Vandalia	727	917	5,922	8,332	2,410	.....	4.07	8.1	9.0	74.46	120.25	.121	.096	.0119	.0059	.00718	.00617	1.66	0.99
Total	11,895	14,061	129,005	201,361	72,356	.....	56.09	10.8	14.5	140.14	141.17	.117	.094	.0106	.0058	.00658	.00625	1.61	0.92
WESTERN CLASSIFICATION—																			
Atchison, Topeka & Santa Fe	7,426	11,271	27,486	64,229	36,743	.....	133.68	3.7	5.7	349.19	315.61	.073	.079	.0079	.0065	.00976	.00929	0.81	0.70
Chicago & Alton	855	1,052	9,386	13,464	4,083	.....	43.50	10.9	12.8	176.16	189.25	.135	.104	.0148	.0075	.00794	.00618	1.87	1.21
Chicago & Eastern Illinois	711	1,234	8,206	24,928	16,722	.....	203.78	11.5	20.2	144.70	153.44	.132	.188	.0096	.0106	.00483	.00530	1.99	2.00
Chicago & North Western	5,219	8,108	40,846	65,873	25,027	.....	61.27	7.8	8.1	151.30	144.66	.108	.116	.0106	.0089	.00830	.00814	1.28	1.09
Chicago, Burlington & Quincy	7,546	9,368	42,287	65,467	23,180	.....	54.81	5.6	7.0	254.87	275.31	....	.092	.0111	.0065	.00851	.00710	1.29	0.91
Chicago Great Western	930	1,455	5,782	10,686	4,904	.....	84.81	6.2	7.3	301.68	257.45	.087	.099	.0081	.0070	.00720	.00684	1.13	1.02
Chicago, Milwaukee & St. Paul	6,423	10,130	35,740	61,495	25,755	.....	72.06	5.6	6.1	189.07	262.13	.093	.080	.0106	.0061	.00929	.00757	1.14	0.81
Chicago, Rock Island & Pacific	3,647	8,098	17,150	46,292	29,142	.....	169.92	4.7	5.7	213.00	239.70	.094	.096	.0096	.0079	.00990	.00870	1.08	0.91
Chicago, St. Paul, Minneapolis & Omaha	1,557	1,753	10,253	12,662	2,409	.....	23.50	6.6	7.2	160.55	156.61	.149	.110	.0135	.0080	.00871	.00814	1.39	0.98
Colorado & Southern	762	1,841	2,979	11,902	8,923	.....	299.53	3.9	6.5	101.00	160.28	.108	.150	.0115	.0100	.01242	.00958	0.93	1.05
Denver & Rio Grande	1,674	2,572	8,359	16,060	7,701	.....	91.65	4.9	6.2	.....	132.66	.118	.157	.....	.0096	.....	.01092	1.09	0.88
Duluth, S. S. & Atlantic	585	603	2,697	2,972	275	.....	10.19	4.6	4.9	49.07	81.17	....	.160	.0209	.0106	.01221	.00823	1.70	1.28
Great Northern	5,418	8,052	21,484	56,079	34,595	.....	161.02	3.9	7.0	192.00	269.98	.104	.113	.0085	.0072	.00899	.00770	0.93	0.93
Illinois Central	3,996	4,767	32,439	61,593	29,154	.....	89.88	8.1	12.9	213.83	243.11	.092	.102	.0094	.0072	.00651	.00546	1.45	1.33
Iowa Central	510	.....	2,238	.....	.....	2,238	100.00	4.4	....	152.30	.....	.099	....	.0084	.....	.00696	.....	1.21	....
Kansas City Southern	833	836	5,118	4,894	.....	224	4.37	6.1	5.9	304.41	267.90	.118	.067	.0091	.0045	.00613	.00744	1.49	0.60
Minneapolis & St. Louis	597	1,646	3,066	7,483	4,417	.....	144.06	5.1	4.5	108.79	165.26	.196	.101	.0155	.0073	.01212	.00798	1.45	0.92
Minneapolis, St. Paul & Sault Ste. Marie	1,255	4,228	6,631	24,116	17,485	.....	263.70	5.3	5.7	194.65	209.93	.129	.104	.0109	.0068	.00658	.00740	1.67	0.92
Missouri Pacific	4,938	7,341	25,186	41,909	16,723	.....	66.39	5.1	5.7	236.24	240.16	.102	.094	.0095	.0067	.00834	.00772	1.15	0.87
Missouri, Kansas & Texas	2,218	3,865	9,669	23,908	14,239	.....	147.26	4.4	6.2	298.93	213.92	.073	.126	.0082	.0110	.00840	.00998	0.98	1.10
Northern Pacific	5,006	6,501	23,138	47,365	24,227	.....	104.70	4.6	7.3	309.60	334.20	.105	.101	.0104	.0067	.00987	.00793	1.04	0.85
St. Louis-San Francisco	1,659	5,255	5,974	29,602	23,628	.....	395.51	3.6	5.6	182.05	168.73	.093	.114	.0114	.0086	.01058	.00970	1.08	0.88
St. Louis Southwestern	1,258	1,753	5,386	13,304	7,918	.....	147.01	4.3	7.6	196.28	237.94	.127	.174	.0130	.0149	.01110	.01030	1.17	1.45
San Antonio & Aransas Pass	687	724	1,553	2,463	910	.....	58.59	2.3	3.4	162.28	132.84	.113	.126	.0142	.0139	.01861	.01491	0.95	0.93
Southern Pacific	7,576	10,956	29,413	45,041	15,628	.....	53.13	3.9	4.1	307.31	246.81	.096	.071	.0062	.0049	.00957	.00977	0.73	0.70
Texas & Pacific	1,570	1,944	6,263	10,839	4,576	.....	73.06	3.9	5.6	231.77	197.20	.079	.091	.0093	.0074	.01030	.00915	0.91	0.81
Union Pacific	5,428	7,918	21,826	36,223	14,397	.....	65.96	4.0	4.6	305.68	414.97	.080	.061	.0082	.0044	.01046	.00885	0.78	0.48
Wabash	2,340	2,519	13,087	17,056	3,969	.....	33.33	5.6	6.8	207.96	257.64	.071	.057	.0068	.0038	.00558	.00622	1.23	0.62
Total	82,624	125,790	423,642	817,905	394,263	.....	93.06	5.0	6.5	211.25	221.07	.104	.108	.0106	.0079	.00926	.00839	1.21	0.97
TOTAL, ALL ROADS	139,289	201,348	1,107,718	1,969,732	862,014	.....	77.82	7.95	9.78	168.89	165.91	.111	.117	.0112	.0084	.00857	.00841	1.36	1.01

NOTE—(1) 1916 operations of Iowa Central R. R. included in Minneapolis & St. Louis. R. R. (2) Before consolidation with other companies. (3) 1916 figures are for year ended June 30th—December 31st not available. (4) 1916 figures are for year ended December 31, 1916.

that all the railways need about 200,000 new freight cars yearly, 100,000 for replacements and 100,000 to take care of the normal increase of business. Statistics compiled by the *Railway Age Gazette* have shown that from 1901 to 1915 the number of cars ordered by all the roads in this country and Canada averaged 174,895 yearly. From 1901 to 1907 the average was 205,361 yearly. From 1908 to 1915 it was but 148,238. In 1916 the orders totaled 170,054, but in the first six months of the present year, they were only at the rate of 90,000 for the year.

These figures are the things that emphasize what the Railroads' War Board has been doing, for it is with this deficiency of equipment that the car shortage is held down to only 77,000 despite the shipments of the cantonments and all the other business that is now being offered to the carriers.

The Interstate Commerce Commission's Figures

The Interstate Commerce Commission's figures for the fiscal year ended June 30, 1916, will also bear out the remarks made above as to the decreases in quantity of equipment on the American railroads. They will also be found of interest because they indicate that there has been even a more pronounced decrease in the number of locomotives than of freight cars. The figures are to be found in the abstract of Statistics of Steam Railways issued early in the week and given elsewhere in this issue. The totals given, inasmuch as they are for the fiscal year 1916, are for a period back of the one included in the two large tables, but they are repeated here in part, because they include all the railways of the country and because they bear the stamp of authority of the Interstate Commerce Commission.

It appears from the annual reports submitted to the commission that there were 63,862 locomotives in their service on June 30, 1916, as compared with 65,099 on June 30, 1915:

Kind of Locomotive	Total 1916	Total 1915
Steam	63,578	64,835
Other	284	264
Total	63,862	65,099

The total number of cars of all classes in service on June 30, 1915, was 2,507,977 assigned as follows: Passenger service, 55,705; freight, 2,356,338 and company service, 95,934. On June 30, 1916, the total was only 2,478,159, assigned: Passenger service, 54,664; freight service, 2,326,987; company service, 96,508. These figures do not include so-called private cars of commercial firms or corporations.

The cars in freight service, exclusive of caboose cars, 2,298,263 in 1916 and 2,327,562 in 1915, were classified as follows:

Item	Total, 1916 Number	Total, 1916 Aggregate capacity *Tons*	Total, 1915 Number	Total, 1915 Aggregate capacity *Tons*
Box cars	1,024,418	36,887,105	1,041,030	36,978,004
Flat cars	136,719	4,991,377	145,191	5,225,995
Stock cars	83,487	2,690,633	86,312	2,759,536
Coal cars	899,638	42,299,287	900,780	41,287,823
Tank cars	9,828	391,176	9,512	379,415
Refrigerator cars	51,746	1,672,967	52,443	1,681,212
Other freight-train cars	92,427	4,012,990	92,294	3,913,556
Total	2,298,263	92,945,535	2,327,562	92,225,541

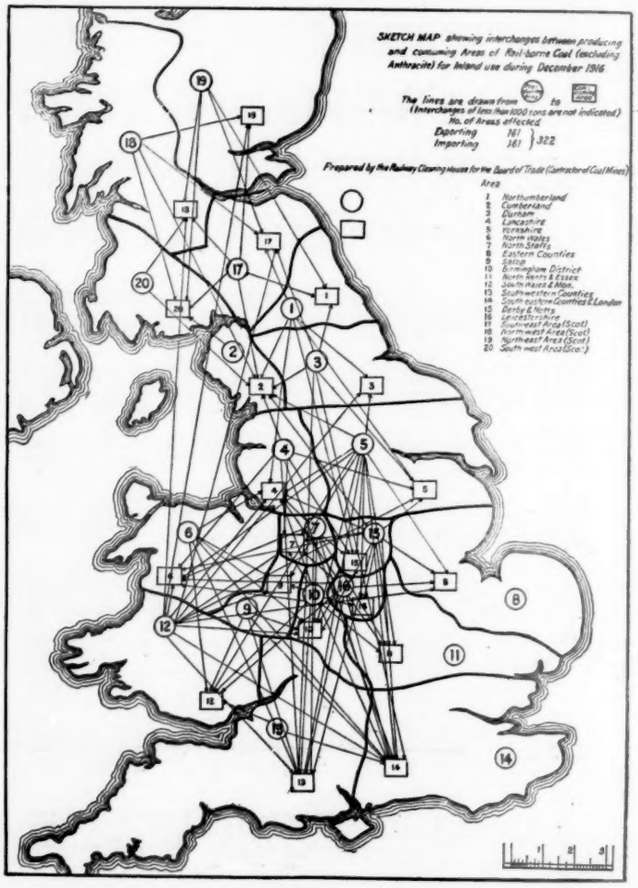
It will be noted that there have been decreases in all kinds of cars except tank and other "freight train cars," and that there have been increases, but only slight ones, in the aggregate capacities.

Another Big Railroad Job.—According to figures recently published, some six million shells were used in the operations that resulted in the capture of Messines. Reckoning these at an average weight of slightly over 100 lb.—probably the average was higher—this would represent a consumption of about 300,000 tons of steel, says the Ironmonger.

ENGLISH RAILWAYS WILL STOP "CARRYING COALS TO NEWCASTLE"

The railways in England on September 8 will put into effect a new scheme for coal handling by which it is expected that they will secure a saving of 700,000,000 ton-miles in coal transportation.

The comptroller of coal mines of the Board of Trade has recently issued an order that, effective at 6 p. m., September 8, 1917, all coal contracts are to be abrogated. Thereafter,


SKETCH MAP showing interchanges between producing and consuming Areas of Rail-borne Coal (excluding Anthracite) for Inland use during December 1916.
Prepared by the Railway Clearing House for the Board of Trade (Contractors' Coal Mines)
Area
1 Northumberland
2 Cumberland
3 Durham
4 Lancashire
5 Yorkshire
6 North Wales
7 North Staffs
8 Eastern Counties
9 Salop
10 Birmingham District
11 North Kents & Essex
12 South Wales & Mon.
13 Southwestern Counties
14 South eastern Counties & London
15 Derby & Notts.
16 Leicestershire
17 Southeast Area (Scot)
18 North west Area (Scot)
19 Northeast Area (Scot)
20 South west Area (Scot)

Official Map Indicating Effect of New Restrictions on Coal Sales

each coal-producing district may sell coal only for delivery in certain stipulated areas. It is stated that this is done:

1. "That consumption of coal should take place as near the producing point as possible."
2. "That in view of the supply facilities afforded by the main trunk lines, the movement of traffic should follow these routes wherever possible."
3. "That the movement of coal should, as far as possible, be in well defined directions; viz.: north to south, north to southwest, north to southeast, east to west."
4. "That an area producing less coal than suffices for its own need should not send any portion of its coal to other areas. That an area producing more coal than it requires for the consumption within the area itself, should distribute the balance to adjacent or convenient areas."

The comptroller of coal mines estimates that this arrangement will effect a saving of 700,000,000 ton-miles in the transportation of coal by the railways.

German Crown Prince's Special Train.—A Hanover Socialist paper expresses anger at the fact that the Crown Prince, when called to Berlin, used a special train, whereby the line from Hanover to Berlin was blocked for a whole night. A number of Reichstag Deputies had to wait the night inside Hanover Station to let the special pass. Such a fact, the paper declares, must be considered by the Socialists of the German Empire as a slap in the face of democracy.

By-Products of an Apprenticeship System

The Tremendous Value of These Is Fast Becoming Apparent on the Atchison, Topeka & Santa Fe

By John H. Linn

A SUCCESSFUL manufacturing plant is established, equipped and manned for the purpose of producing a certain definite product. The principal effort of each management is directed towards the perfection and marketing of this primary product; but in every case certain opportunities arise whereby with but little additional effort or expense other secondary products, known as by-products, may be produced, thus greatly augmenting the net profits of the plant and making it possible to produce a better primary product at much less expense than if the material going into these by-products were allowed to accumulate as waste. For example, in the manufacture of steel such by-products are produced as ammonium sulphate, benzol, naphtha and slag. The primary purpose of a packing house is to produce edible meats, but to these are added such by-products as leather, pepsin and other medicines, glue and glycerin, oleo, axle grease, soap, shoe polish, hair for mattresses and plaster, combs, hair pins, violin strings and fertilizer.

The by-product may be very much unlike the primary product. One of the by-products of carborundum, the hardest abrasive made, is graphite, very valuable as a lubricant. In many cases, were it not for the income derived from these by-products, the primary product would be unable to meet its competitors in the open market. In this age of business thrift and industry everything must count, must be conserved, must be made to produce results; every atom must be utilized and devoted to some useful purpose. Today we have so many and such important by-products that we really do not think of them as by-products, and fail to realize that they are made from material which would otherwise be wasted, from opportunities which would otherwise be lost.

So, too, in the developing and training of skilled mechanics other results are produced, which, like the by-products of the manufacturing concerns, greatly augment the net profits arising from the scheme. The *Railway Age Gazette* has often referred to the modern apprenticeship system of the Santa Fe and the remarkable results obtained under the guidance of the supervisor of apprentices, F. W. Thomas. Since this road has given such attention to its human element, particularly the young men being trained for the mechanical department, it is interesting to know more of the results actually obtained. First let us consider the purpose of the apprentice organization, the primary product to be produced.

Primary Product

On the first page of the first edition, and also of the latest edition, of the pamphlet which the supervisor of apprentices has issued describing the apprenticeship system of this road, we find these words, taken from remarks by Mr. Purcell:

"Our object is not to make mechanical engineers, but to make first-class skilled mechanics, to recruit our shop forces with men—trained, educated, 'Santa Fe way.'" This positive statement from the founder of our apprenticeship system, the present head of the mechanical department of the road, leaves no doubt as to the purpose of the apprentice organization, no doubt as to the primary product the apprentice instructors are employed to produce—first-class skilled mechanics, trained and educated "Santa Fe way." Whatever else they may be able to do; whatever other results they may accomplish, they never lose sight of this primary purpose for which the department was organized—the developing and locating of the skilled mechanic for the shops.

During the past decade, through its apprentice department, the Santa Fe has greatly improved both the quality and quantity of this product. Over 700 skilled apprentice graduates are at present working in its shops, at points where they are most needed. At its largest shop, in spite of the present demand all over the country for mechanics and the high wages offered them, it has not been necessary to employ a mechanic from the outside for over 2½ years. This condition is due to the intense loyalty of these apprentice graduates, evidenced by the large per cent remaining in service. The value of this product alone would more than justify the expense and effort of the apprentice department. The mission of this article, however, is not to discuss this primary product, but instead, the by-products which are produced in connection with the work of this modern apprenticeship system.

Just as the manufacturing industries have long since learned that in the production of the primary product certain opportunities arise whereby with little additional effort or expense, secondary products known as by-products may be produced, so in the developing of these skilled mechanics opportunities arise for producing other valuable results, a few of which I shall mention here. No attempt will be made, however, to discuss them in the order of their importance, nor shall I be able to mention them all. Moreover, many of them will overlap and be intertwined or interwoven with each other, or with the primary product, so as to be hardly distinguishable.

The Promoted Graduate

Let us first consider the promoted graduates, very rapidly increasing in number. As the system of apprentice instruction has been broadened in scope and rendered more efficient; as the increased opportunities given the apprentices have attracted a better class of boys with which to start; as the apprentice boards have studied more closely the fitness of each boy and weeded out the undesirable material at an early date, thus making room for more and better boys; as the apprentice instructors have entered more closely into the real life of each of their boys and learned more of their ability and capacity, more of their talents, active and dormant; as they have passed on to their local officers and to the central apprentice organization the knowledge they have thus gained—more and more of these graduates have been given positions of trust and responsibility. These young men have made good and justified the confidence placed in them, and proved to the management the value of the apprentice instruction and the reliability of the recommendations of the apprentice organization.

Today there are over 150 of these graduates occupying official positions, some of them of no little responsibility. All of these young men completed their apprenticeships within the past decade. Only those who were graduated during the past five years received the benefit of full four years of the modern apprentice instruction. None of them received the full and complete instruction and training and experience given the apprentices today, for the department is constantly improving its courses. What may not be expected of these boys in another ten years, to what heights may not some of them climb, what great things may they not do for the Santa Fe and the community in general?

When you think of all this, can you conceive the magni-

tude of this work, or realize to the full extent the value of the by-product of this organization? Surely it must be a source of great pleasure and satisfaction to the management to know that whenever a man is needed for this, that, or the other position, someone, by nature endowed, and by training fitted, is ready to fill this particular position, and better still, another is ready to step right into the place thus vacated.

Furthermore, the production of this by-product, instead of interfering with the production of the primary product, the skilled mechanic, really increases both the quality and the quantity of the primary product, for more and better boys are attracted to the apprenticeship system, and more of them remain with the company after graduation, knowing that no one else could offer them better treatment. They realize that if they are to receive promotion they must prove their ability by taking full advantage of the opportunities offered them. Just as the college graduate is loyal to his alma mater, and has a feeling of fellowship for the graduates and under classmen of his school, just so these promoted graduates are loyal to the apprentice department, and have a feeling of fellowship and friendly interest in all other graduates and in all apprentices, and take pleasure in striving to better their condition.

Preparedness and Watchful Interest

The next by-product is closely related to the one just mentioned, in that it gives evidence not only of the ability of these young men, but also of the full interest taken in them by the department. I refer to the last three Ryerson scholarships awarded by the Master Mechanics' Association having been won by Santa Fe apprentices. These scholarships, which by the way are sufficient to pay necessary expenses for a four-year college course in mechanical engineering, were open to all young men in the United States, particularly those having a high school education and at least two years of shop training. The fact that Santa Fe apprentices have won this coveted prize three times in succession, is no small honor.

But proud as the company should be of these winners, still prouder should we be of the conditions which brought about those victories. Without a doubt there were many capable young men on other roads. It is possible some of these may have been as talented and possibly as fully prepared as were the winners, but the Santa Fe apprentice boys were not only capable, talented, and prepared, but through the apprentice organization and its constant watchfulness for good things for its young men and for the company, they learned that these scholarships were to be awarded, and not only received full information regarding the contest, but the instructors took pains to pick out the most promising and get them lined up for the examination. This same spirit of preparedness and ever-watchfulness is in evidence in many other phases of this work, and is giving the Santa Fe returns which, though difficult to estimate, are of such value as to make this by-product worthy of consideration.

Technical Work of School Instructors

Another by-product worthy of mention is the technical work of the school instructor. As one of the few technically educated men in the shop, he is called upon for advice or suggestions on matters of great importance. His special duties vary from making a design for a new shop whistle, to determining how many cars a new type of locomotive will pull over Tehachapi. The apprentice school rooms are fast becoming emporiums of mechanical information, to which everyone in search of mechanical or technical information, of no matter what nature, is urged to come and partake of the waters that flow freely. The fact that more and more are constantly taking advantage of this invitation proves that the fountain is by no means dry. It must be a source of great pleasure to the master mechanics to have on their staffs school instructors who can be trusted with matters of a confidential nature and depended upon to work out a solution of all technical questions that may arise. In addition to his special duties the school instructor generally has charge of all the shop drafting, and looks after all the shop blueprints. His entire salary is charged to the apprentice department, but were it not for him, someone else would have to be employed to look after much of this work. It does not require much of a calculation to realize something of the value of this by-product.

Work of Shop Instructors

There is also a by-product from the work of the shop instructor. Since he works in harmony with the foreman, he is thoroughly familiar with his duties. If for any reason the foreman is absent, the shop instructor is ready to take his place. Furthermore, since the shop instructor is held responsible for the thorough instruction of the apprentices, and for all work spoiled by the apprentices, the foreman has more time to devote to other duties. Since the shop instructor knows what boy is best fitted for performing any job that arises, and also knows what boy needs the experience offered by the job in question, and can best give the instruction when the boy first starts on the job, the foreman usually assigns the work to the apprentices through the shop instructor, thus being relieved of any further trouble in the matter.

Every one likes to do what he can do well. No school is disorderly wherein the pupils are interested in their work. Just so in the shop. Through the work of the shop instructor the apprentices are kept interested in their work, and as a result little effort is needed to keep them busy, and as they are constantly busy the other mechanics get the fever, for industry like idleness is contagious, and thus the foreman is relieved of the necessity of devoting so much time to driving his men. If it were not for these shop instructors it is needless to say there would be need of greater supervision in most of the shops. As has been stated, the salary paid the shop instructor should be considered not an expense, but the most profitable investment that can be made. He is the most necessary part of the apprentice organization.

Shop Output of Apprentices

The shop output of apprentices is perhaps the most visible by-product of the department. The systematic instruction given an apprentice boy from the day he enters his apprenticeship until his graduation produces a much greater output than one would expect. On many jobs his output exceeds that of the ordinary mechanic. He would excel the latter in a baseball game or football game, in a track meet, or in any physical contest requiring strength, agility or quickness of muscle and mind. He is more ambitious and more desirous of outdoing the other fellow than is a man of maturer age. Is it any wonder then that when properly instructed, and properly interested in his work, he can often turn out more work and better work than the ordinary mechanic? Moreover these apprentices are taught the latest and most up-to-date methods of performing each class of work, and from the start are not only taught habits of industry, but also made to realize that time is fully as important as material, and thus made to do their work with the minimum waste of either material or labor. The results have shown conclusively that the extra work turned out by these boys while apprentices, more than justifies the entire cost of their instruction.

Present Industrial Situation

Thanks to its apprenticeship system the Santa Fe is unusually well prepared to meet the drain which the present war situation is making on the shop forces of all the railroads and manufacturing concerns in the country. Should it be necessary to employ raw recruits to fill the places of those entering government service, the system of instruction already in vogue in training its apprentices can be used to

give necessary instruction to other men who may be employed.

Effect on Other Employees

Another by-product of the department is the improvement in the general moral tone of the shop. Many of the requirements made of the apprentices have had a very wholesome effect on the other shop men. They are more regular and prompt in reporting for work, more particular about the quality of the work they turn out, more desirous of learning the latest and best methods of performing their work, more willing to pass on to others the benefits of their experience, more confident in the management, and more loyal to the Santa Fe. From the fair treatment at all times demanded for the apprentices, there has gradually come about a better treatment of all the men in the shop. There is less of the old time raw-hiding spirit and more recognition that "a man's a man for a'that, the rank is but the guinea stamp, the man's the gowd for a'that."

Effect on Lives of Apprentices

In conclusion I wish to mention one other by-product, one more important than any of the others, yet closely intertwined with all the others, and very necessary to the full enjoyment and development of each of the other products. I refer to the influence exerted by these fatherly and companionable instructors upon the lives of the young men in their charge. The instruction and counsel given them, the example set before them by their own conduct and daily life, has a large influence in molding the habits and ideals, the ambitions and aspirations of these young men just entering into manhood.

Someone has said that the greatest thing one human being can do for another is to help that individual become an independent self-sustaining member of society, that the ability to make a good living and to support those near and dear to us, is the beginning of all virtue. The apprentice department of the Santa Fe is doing this, not for one, but for many. Moreover, they do not stop at this. They are helping to mold the characters of the boys and increasing their desire and capacity for service to others. The work really brings the instructors very close to each boy. Unless they can win his confidence, and inspire the best that is in him, their work will be in vain.

What a world of opportunity for achievement in the army of over a thousand boys now in these apprentice schools. Who knows which of them will develop into a future Stevenson a Marconi, a Thomas Edison, or a Matthias Baldwin. What a glorious thing to have a part in the development of such a life; what an awful thing to feel that the possibilities of any life have been blighted by any act or shortcoming of ours. You have similar boys working with you. Are you giving them the best that is in you? Do you not owe this to them and to the company by whom you are employed? Surely, there is no greater opportunity for usefulness than the development and improvement of the human element. Does not modern apprenticeship pay? Is it not well worth the effort?

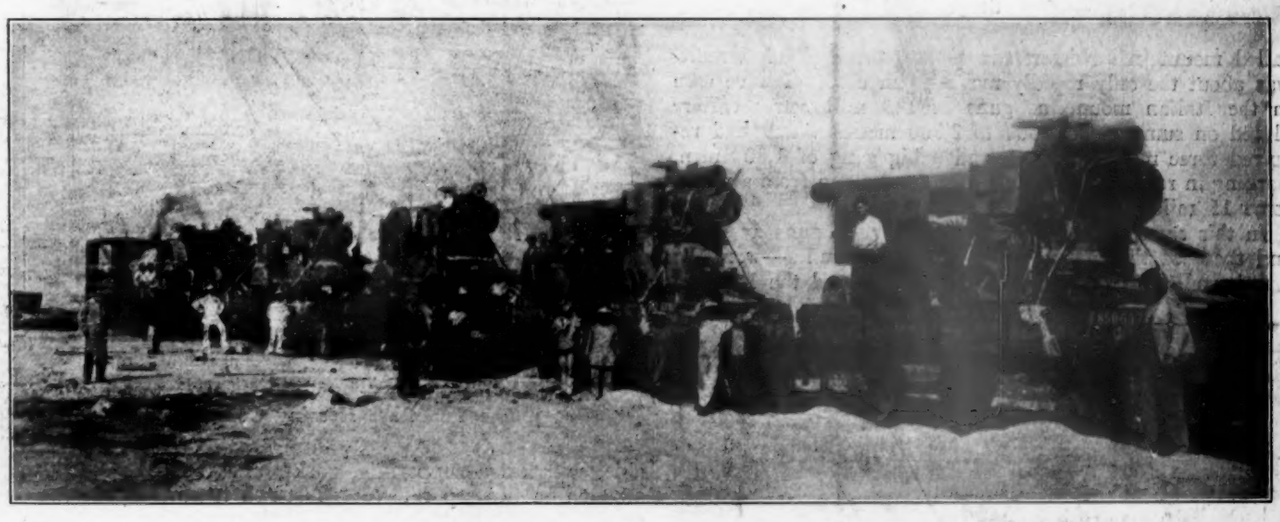
RAILROADING BIG GUNS INTO FIRING POSITIONS

By Our Special European Correspondent

The use of guns greater than ever dreamed of before this war, has given rise to the problem of handling them effectively, of transporting them from factory to army front and of transporting them from place to place on the front according to battle conditions. A big gun is a white elephant if you can't handle it. It is a "tank" that won't roll. If the enemy breaks through your trench lines two, four or six kilometers, and does the job in a smashing, hurry-up fashion, he is sure to take these guns that are the very life and heart of modern defense unless you have some way of getting the guns away quickly.

Because of its difficulty, it has become more of a railroad than an artillery task to save heavy guns, or to rush them forward to new positions if the enemy is being beaten back. In the old days before this war the handling of artillery pieces was done by strong horses or mules, but in those days a five-ton gun was considered the heaviest possible weight of a piece intended for field operations, and the field guns averaged two, two and a half to three tons.

Today there are thousands of guns on every army front of the various nations ranging in weight from 30 to 50 tons, and many dozens of the giants that weigh from 50 to 75 tons. The projectiles of some of these guns weigh a short ton. During the worst month of the fighting at Verdun no less than 500 trains composing 25,000 cars carrying 10 tons each of projectiles were required by the French. The Germans are estimated to have used there 3,000 cannon of a total weight of 60,000 tons, and the position of many of these cannon had to be constantly shifted to prevent their destruction by

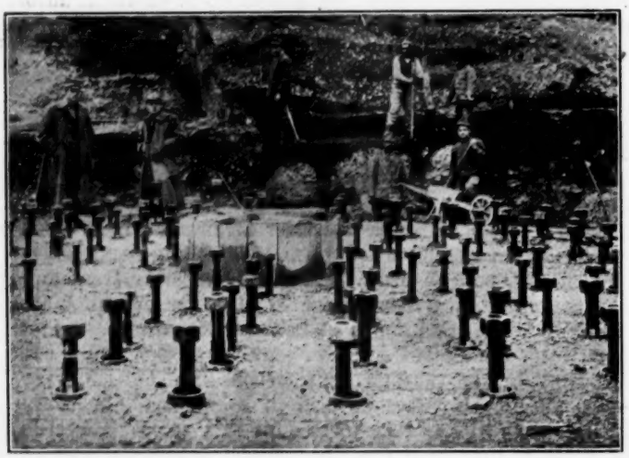


Official Photograph from the Italian Navy Department

Unloading 255 Mm. Guns at the Front

French artillery fire or to answer the changes of the battle line, covering at first a gradual advance of 12 miles and later a retreat over the same ground.

In the early part of the war, because of the lack of proper facilities for handling rapidly even the heavy guns then existing, it would take months to get guns into position, particularly during rainy weather when the roads were deep with mud. In the French and Italian mountains the so-



Official Photograph from the Italian Navy Department.

Building a Gun Base with Railroad Connection—the First Stage

called mountain howitzer, strapped to the back of a mule, was about the only rapidly moving gun used. I have seen in the Italian mountains guns of 149 millimetres calibre placed on summits of 2,000 to 2,500 metres which had required three months of time and a big gang of 1,800 men, working in relays of 600 each, to move the gun from a valley some 15 miles distant.

In this same early war period the biggest guns available and those of the longest range—15 to 24 miles—were the long-barrelled marine guns of the French and the Italians.

Official Photograph from the Italian Navy Department.

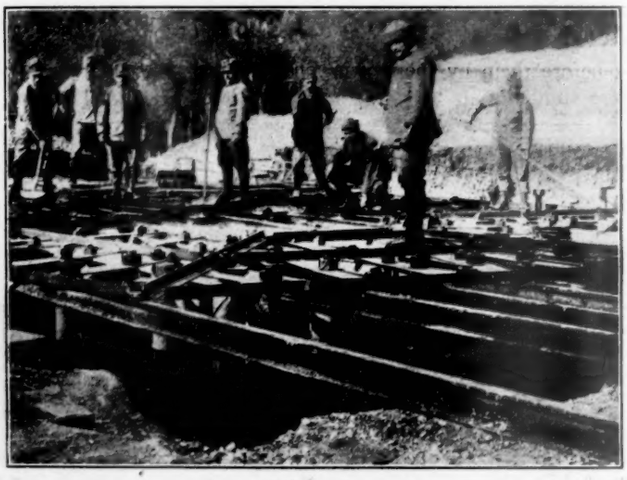
The Second Stage

But while they were sorely needed, there were no facilities to carry the guns within close firing distance of the enemy, or at least there was the constant danger that if the guns were carried forward and their location discovered by the enemy artillery, the guns would be lost because of the lack of means to shift them to new positions. For this reason the marine guns of the Italians, their 240 millimetre ones weighing upwards of 15 tons, had to be kept in reserve far behind the front for defensive purposes.

At this period of the war, before the present vast network of railway lines was built purely for war uses, the flat cars used for artillery transportation were of the most primitive description. Due to the European principle of building flat cars of a uniform type, different types of cars being objected to as obstacles to the rapid and economical handling of freight, the average car was not fitted for big gun transportation. The very old cars averaged 18 feet in length and were just strong enough to carry from 8 to 10 tons. One of the exceptions in recent years to this car type was that found on the Northern Railway of France, where the ore cars were 50 feet long and built to carry 40 tons of weight. It was such cars as these that the French used in railroading their marine guns during the fighting along the Yser and the Meuse some 18 months since.

When it was gradually discovered that big guns were not intended merely for battle ships and forts, that the Allies would have to use them as the Germans were using them, quantities of these heavier guns were built, and the problem of transporting them was solved.

Formerly the body of the gun was wholly dismounted from its carriage and laid flat on a separate car. At present and for some time past, it has been the practice to load the 20-ton guns on a single flat car of the strongest type avail-



Official Photograph from the Italian Navy Department.

The Gun Base Nearing Completion

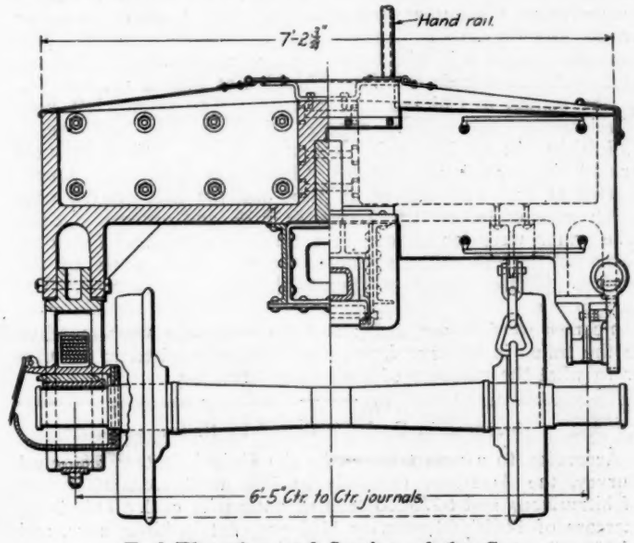
able, with extra supporting trucks, and the guns of 30 to 40 tons on two separate cars, fastened together by a single overhead steel platform on which rest the gun and gun truck. The same system is used with the 50-ton guns, though in this case all-steel frame cars are being specially constructed for this particular use. The use of two different short cars hooked together appears to help in the turning of curves. One of the most imposing sights witnessed by civilians is that of these big guns as they pass along the railway. At stations where halts are made great crowds gather, and little children clamber upon the gigantic pieces to thrust immense bouquets of flowers into the 15-inch cannon mouths.

When the train carrying such pieces arrives near the front, the process of placing the jumbo in position begins. This is generally carried on at night and with the utmost secrecy. The men of the railroad corps must accompany the gun to its final position, building a permanent track thereto. The way the job is done on the Italian front is shown in the photographs that accompany this article. After the revolving turn-table bed for the gun is prepared, the gun is slid on strong hand cars into position. While the job of removing the gun to a new position is not a light one, it is no longer an impossible one, thanks to the rails.

SCALE TEST CARS

The Louisville & Nashville has placed five scale testing cars in service, each of which is provided with an auxiliary car to afford living and working quarters for the scale testers while on the line. These cars have been assigned to scale testers, each of whom is responsible for the accuracy of the scales on a certain defined district of the railroad.

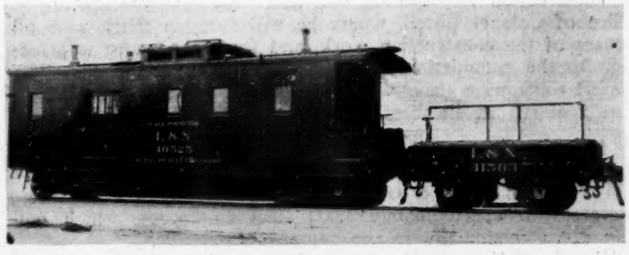
The scale cars are of the modern two-axle, short wheel-base type, and weigh 60,000 lb. The length of the body is 12 ft. 6½ in., the wheel base is 6 ft. 6 in., and the height from top of rail to top of the running board is 5 ft. 4¾ in.



End Elevation and Section of the Car

The car is entirely of iron and steel. The body consists of four box-shaped cast iron members which were accurately machined and drilled to be bolted together on the longitudinal and transverse center lines of the car. To insure good alinement and proper stiffness the body is reinforced along the longitudinal center line just above the steel center sill by a steel bar 12 in. high by 4 in. wide extending the entire length of the car and fitting into a recess formed by offsets in the adjoining faces of the cast iron sections.

These four cast iron boxes forming the body of the car are designed to hold 108 50-lb. weights. The car is covered by a roof made of 3/16 in. steel plates arranged to provide



The Test Car with Its Auxiliary Car

a running board along the longitudinal center line of the car and also to provide for trap doors opening into the compartments of the car body for the removal of the test weights.

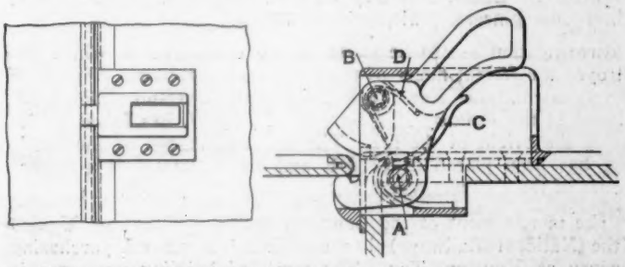
The interior of the auxiliary or quarters car is divided into three compartments, a kitchen and living room at the platform end, a bedroom in the middle, and a workshop at the far end. The cars are supplied with all necessary appurtenances for the living quarters and the workshop is equipped with a work bench, a forge and anvil, a box for extra test weights and other tools and equipment of use to the inspector.

These scale and auxiliary cars are being used by the inspectors in making regular trips over the assigned territory for the periodic inspection and test of all track scales of the railroad and also the track scales of private owners adjacent to the line in all cases where weights are accepted by the railroad for billing. By following a regular route it is anticipated that the inspectors can cover the territory every 60 to 90 days. In addition to the testing and inspection of these scales the inspectors are instructed to make all adjustments and repairs on company scales except when they are in need of a general overhauling. Inspectors are also required to examine and test all freight house and baggage scales at least once each year. The condition of each scale tested is reported on a form designed for the purpose, one copy of each report going to the superintendent, one to the superintendent of machinery and one to the chief scale inspector.

Special instructions are given to the trainmen for the proper handling of this special equipment. These cars must always be hauled just in front of the caboose and on arrival at terminals must be set off where they will not be subjected to unnecessary switching. Under no circumstances are they to be handled in switching other cars in the train.

LOCK FOR VESTIBULE TRAP DOORS

In the June 14, 1916, issue of the *Daily Railway Age Gazette*, was published a description of the Universal trap door which was manufactured by the Transportation Utilities Company, in connection with which was shown a special type of door latch and wedge lifter. A new type of door latch, which performs the same functions of latch and lifter, has recently been developed, for use with this and the National trap door, by the Tuco Products Corporation, New York, successors to the Transportation Utilities Company.



Foot-Operated Vestibule Trap Door Latch and Starting Device

This latch is much simpler than the one previously described, being foot operated and self contained.

By referring to the drawing it will be seen that the moving parts consist of the foot release lever, the latch and two springs. The release lever, which is pivoted at *A*, contains the latch and latch spring *D*. The latch is pivoted at *B* and when the trap door is closed, is forced back to permit the door to pass, against the tension of the latch spring. As soon as the door closes, the spring again forces the latch out to the position shown in the drawing. In opening the door, the latch itself is not moved. By stepping on the foot lever it is forced down against the tension of spring *C*, carrying back the latch with it, the whole moving about the pivot *A*. As the upper end of the lever is forced down by the foot, the lower end of the lever, which extends under the edge of the trap door, moves up, thereby starting the door. This serves to insure ready operation of the door, should it become frozen in place or stick from any other cause.

The design of the foot lever is such that no special care is required in its operation as a downward pressure exerted on it with the foot, no matter at what angle it may be applied, serves to operate it. The operator is thus enabled to so place himself that his leg will not be struck by the edge of the door as it swings up.

General News Department

The Baltimore & Ohio has installed telephone train despatching between Wheeling, W. Va., and Holloway, Ohio.

The Gulf Coast Lines have granted bonuses, amounting to about ten per cent, to employees not connected with labor unions. The bonus will be paid quarterly beginning October 1.

In the Federal Court at Fort Smith, Ark., the United States district attorney has filed suit against A. L. Mills, receiver of the Fort Smith & Western, alleging six offenses against the provisions of the Adamson "eight-hour" law.

Thomas F. Molloy, of the accounting department of the Baltimore & Ohio, has been transferred temporarily to the department of food administration, at Washington, to assist in formulating a system of accounts for the food control board.

In a fire at Northampton, Mass., August 6, the freight house of the New York, New Haven & Hartford and the Boston & Maine was destroyed, together with 12 loaded freight cars and a large quantity of merchandise; estimated loss, $75,000.

The United States Civil Service Commission announces examinations, September 5, for junior civil engineer and for junior architect, to fill places in the Division of Valuation, Interstate Commerce Commission. Applicants must be between 21 and 36 years old, and the salaries are from $1,200 to $1,680.

The twenty-fifth annual meeting of the Society for the Promotion of Engineering Education was held in Washington, D. C., on July 6 and 7. The program was devoted to the general topic: "The Relation of Engineering Schools to the Government During the War." Among the speakers were Hon. Newton D. Baker, secretary of war, and Gen. W. M. Black, chief of engineers, United States army.

Investigation as to the cause of the conflagration, which destroyed the freight house of the Cleveland, Cincinnati, Chicago & St. Louis and the New York Central at Cleveland, Ohio, mentioned in the *Railway Age Gazette* of July 27, has failed to develop the origin of the fire. The loss on account of the building has been placed at $21,398, and the estimated loss on account of the contents which were destroyed is $25,000.

The management of the Constitutionalist Railways of Mexico (the National Railways) has established a general purchasing agency at Houston, Tex. The work of building new cars is progressing rapidly in the shops at Aguas Calientes and the City of Mexico. It will be necessary, however, to buy in the United States large quantities of iron and steel fittings for the cars, including wheels. An enormous tonnage of new rails will be needed to place the 8,000 miles of track that comprise the Constitutionalist Railways in fit condition for traffic. The Mexican government has placed a large order for rails with the Monterey Steel & Iron Company.

Press despatches from Bainbridge, Ga., report that no trains are running on the Georgia, Florida & Alabama Railway, every engineman, conductor and brakeman having resigned. Threats of a strike were made some time ago, and an injunction had been granted in which all employees were enjoined from striking or taking a strike vote; or from reporting to their national organizations, or any other persons or corporations, the statement that any strike had been called; but the men are claiming that they have not disobeyed the order of the court; they are simply resigning as individuals. This road, extending from Richland, Ga., southward to Tallahassee, Fla., 132 miles, with an extension 50 miles farther to Carrabelle, runs two passenger trains daily each way over the greater part of its line. For 26 miles on the north end, the 50 miles on the south end, there is only one passenger train a day, each way. A later despatch reported the resumption of train service.

The value of efficient co-operation between the War Department and the railways in the handling of troops is illustrated by the facts, regarding the way the men in the officers' training camp at Fort Sheridan were brought to Chicago last Saturday for the parade of Chicago's quota of registered soldiers. The bringing of the men from Fort Sheridan involved the movement over the Chicago & North Western of 4,000 troops a distance of 26 miles; and the whole number were handled the entire distance in one hour and twenty minutes. The North Western's heavy regular suburban business was moved over the same tracks meantime, without any disturbance of its schedules. The men were carried in five trains, making an average of 800 per train. The first train left Fort Sheridan at 6:45 a. m., and was in the station in Chicago at 7:26 a. m. The second left Fort Sheridan at 6:58, thirteen minutes after the first, and was in Chicago at 7:58. The third left at 7:09, only eleven minutes behind the second, and reached Chicago at 7:57. The fourth started at 7:21 and arrived at 8:09, and the fifth started only seven minutes behind the fourth, at 7:28, and arrived at 8:23. The trains were loaded one at a time; and the fact that only seven to thirteen minutes elapsed between their times of departure indicates how expeditiously the loading was done. The cars in every train were so numbered as to show exactly what companies were to use them; and the men, who were marched to the trains in military formation, were all advised in advance as to what the numbers of their cars would be.

Increase in Coal Consumed by Railways

According to a report issued by the United States Geological Survey, the American railroads in 1916 used 135,000,000 tons of bituminous and 6,735,000 tons of anthracite coal. This is an increase of 14,000,000 tons, or 11½ per cent in bituminous, and of 535,000 tons, or 8½ per cent in anthracite. The western roads consumed 6,500,000 more tons than in the year before, an increase of 15 per cent., and the increase for the eastern and southern roads was 11 and 5.1 per cent, respectively. The coal consumed by railroads was 27 per cent of the production of bituminous coal in the country, and 7.7 per cent of the anthracite production.

Railroads to Help Army Cantonments

Fairfax Harrison, chairman of the Railroads' War Board, has authorized the following statement: "To facilitate the movement and prompt delivery of materials for the construction of army cantonments the Railroads' War Board has assigned C. E. Denney, assistant to the president of the Nickel Plate, to the Quartermasters' department in Washington. During the period of construction Mr. Denney will make his headquarters in the office of Colonel Littell, where he will keep in touch with all phases of the construction work, and furnish advance information to the commission on car service of the Railroads' War Board concerning the government's orders and the number of cars required to fill them."

Further Increases in Pay

The International & Great Northern recently granted wage increases to approximately 1,000 shop employees, which will add $140,000 annually to the company's payrolls.

The Great Northern has granted wage advances to employees in its mechanical department, most of which were retroactive in their effectiveness. In the car department monthly employees received a 10 per cent advance, effective May 1, and men employed by the hour a 3-cent increase, effective May 1, and 2 cents additional, effective July 1. Machinists at Minot, N. D., and east, received a 7½-cent increase, effective May 1, and west of Minot 5½ cents, effective May 1, and 1 cent additional, effective June 20. Machinist apprentices were granted 2 cents an hour additional, and machinists' helpers a minimum wage of 27 cents an hour, effective May 1. Boiler shop employees were awarded a 5½-cent increase, effective May 1, and 1 cent an hour additional, effective June 1; tank and paint shop employees, 3-cent increase, effective May 1, and 2 cents additional,

effective July 1; shop laborers, an increase in wages of 2½ cents, effective June 1; clerical help, 25 per cent, effective May 1; tin shop employees, first-class, 5½ cents, effective May 1, and 1 cent additional, effective June 1; second-class, 3 cents, effective May 1; shop superintendents, $20 per month, effective June 1; blacksmiths, 5½ cents to 10½ cents per hour, effective June 1; and various shop foremen, approximately $20 a month, effective May 1. About 7,130 men are affected by the increases.

Railway Returns for June

The Interstate Commerce Commission's partial summary of railroad revenues and expenses for the month of June, 1917, based on returns for 153 roads, operating 186,000 miles, shows an increase in net revenue per mile from $433 in June, 1916, to $474 in June, 1917. Increases in net operating revenues are shown by the roads in eastern, southern and western districts. For the six months ending with June the same roads show an increase in operating revenues from $1,326,187,000 to $1,489,248,000, an increase in expenses from $905,687,000 to $1,065,281,000 and an increase in net operating revenues from $420,499,000 to $423,966,000. The increase in net revenue per mile was from $2,264 to $2,275. The roads of both the southern and western districts show increases in net revenue per mile for the six months, while the eastern roads show a decrease.

The Union Pacific Will Relocate Ames Monument

On account of a change in the line built for the purpose of shortening the road and for cutting down the grade, the monument erected 37 years ago to the memory of Oakes Ames and Oliver Ames, the builders of the Union Pacific, was left standing nearly five miles from the new tracks. The monument is built of granite in the form of a pyramid 60 ft. sq. at the base and 60 ft. high. It will be taken down a stone at a time and carried on wagons and stone-boats across the five miles of mountain to its new site just east of the station at Sherman, Wyo. On one side is a bronze medallion of Oliver Ames, and on the other a medallion of Oakes Ames. At the same time that the monument is being moved to a new pedestal the road is now driving a second tunnel under the mountain at the top of Sherman Pass as a part of the project to complete the double-tracking of the Union Pacific.

1,898 Miles in 24 Hours

At the Sheepshead Bay trotting course, New York City, August 1 and 2, a Chalmers six-cylinder automobile was run around the two-mile course 949 times, 1,898 miles, in 24 hours, equal to 79.083 miles an hour, including stops. No human being has ever traveled so many miles in that length of time on the face of the earth, and no aviator has made any record at all for any such long distance. This distance is about equal to that from New York to Denver by the Lincoln highway. In the first hour this car traveled 83 miles, and in the twenty-fourth hour over 81 miles. All former records for 100 miles were beaten, this distance having been made in 70 min. 46 sec.

The car was driven by Messrs. Dawson and Cardham; Dawson for about 19 hours, and Cardham 5 hours. Twenty-two stops were made, consuming 35.6 minutes.

The motor which made this remarkable record is a regular stock Chalmers motor, 3¼-in. bore by 4½-in. stroke, with a piston displacement of 224 cu. in.

War Service Census of Railroad Workers Taken

Under the direction of the Railroads' War Board, every road in the United States is taking a census of the men employed by it, with a view to assisting the government in determining who should and who should not be exempted from military service. The regulations of the war department provide that "there can be no exemptions by classes, but each individual case must be taken up and determined upon its own merits, having, of course, consideration for the maintenance of the national interests as provided by law." The Provost Marshal General has advised the Railroads' War Board, however, that "it is the policy of the administration to so execute the 'selective service act' as not to unnecessarily cripple any industry."

The census being taken by the railroads will show the men who are married and those who are not, with details as to those dependent upon the married men. A second classification will show those who can be replaced either by men inexperienced in railroad operation, or by women, and who therefore may be relieved from the service without embarrassment. The railway lists of those, who, it is believed, should be released from military duty are to be prepared in detail for each district. With the lists will be affidavits setting out the facts in detail subscribed to by the immediate superior officer, and certified to by the superintendent or head of the department in which the individual is employed. The railroads will make direct application to the exemption board for the exemption from military service of all employees who, as shown by the list and affidavits, should be released from military duty under the terms of the selective service law.

Southern Pacific Wage Negotiations

The strike order of train and enginemen on the Pacific system of the Southern Pacific has been withdrawn, and the road is in conference with grand officers of the brotherhoods. The prospects of settlement are said to be good. The more important contentions are: (1) Claims for continuous time at certain terminals; this is a technical interpretation of the enginemen's schedules and involves points previously considered. (2) Application of seniority rules. (3) Restricting use of crews en route in road service and under pay from helping trains at established helper terminals where helper crews have a daily guarantee. (4) Claim for full time when not available for duty on account of the operation of the sixteen-hour law. (5) Placing all extra men at helper terminals and other outside points on a daily guarantee. (6) Switching restrictions for crews in road service. (7) Duplicate payments and minimum day feature. (8) Full crews on engines with steam in boiler when being towed in trains.

Wage Increase for Southeastern Shop Employees

The wage controversy between the southeastern railroads and their 25,000 federated shop employees, which has been in progress since February 20, has been settled, except for the adjustment of a few details, by a decision of Secretary of Labor William B. Wilson, to whom it was referred, after mediation by a representative of the department had failed. Secretary Wilson's decision provides for an increase of 8½ cents an hour to mechanics and specialists, and 6½ cents for all other men represented. The railroads had previously agreed to give the eight-hour day and 6 cents an hour. Car inspectors and repairers, train car repairers, train air brake repairers, safety appliance maintainers, oilers and packers and all others employed in the car department, and for whom an eight-hour day had not already been agreed to, under the decision will have their basic day reduced two hours per day, but in no case shall the basic day be less than eight hours nor more than ten hours a day, and they shall be paid time and one-half for overtime as per overtime rules already agreed to.

The secretary's decision also included the following:

"None but mechanics or apprentices, employed and paid as such, will be assigned to do mechanics' work as per special rules of each craft, except at small outlying points where unimportant emergency jobs are required. Helpers will not be advanced to the detriment of mechanics. This rule shall not apply to foremen.

"It shall be definitely understood that the adjustment of claims for injuries received is one of the grievances that may be taken up for adjustment under the rules governing grievances.

"The request of the men that one sheet metal worker be employed to every five machinists shall be investigated by the management, and where there is sufficient work at any point to keep one employed a reasonable amount of time, a sheet metal worker will be employed without reference to the number of machinists employed.

"The request of the men that all electricians be paid on an hourly basis is denied. The offer of the managers to establish a minimum rate of 42 cents an hour for men employed on the hourly basis is accepted, and the increase for men employed on a monthly basis will be $15 a month."

He also denied certain other requests of the employees.

The railroads were represented in the negotiations by a managers' committee, of which John R. Gould, superintendent of motive power of the Chesapeake & Ohio, was chairman.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1917

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Alabama & Vicksburg	143	$170,075	$38,963	$164,194	$24,218	$34,090	$5,229	$60,884	$655	$6,172	$129,259	$34,937	$10,304	$24,053	$7,707
Alabama Great Southern	312	458,742	136,024	639,408	60,586	153,183	15,765	180,224	2,004	10,401	420,542	218,865	29,496	189,368	37,795
Arizona Eastern	378	271,194	53,064	351,896	38,460	34,627	2,477	68,943	7,358	15,276	167,069	184,828	19,953	164,595	56,866
Atchison, Topeka & Santa Fe	8,639	8,341,024	2,631,374	11,815,430	1,592,498	1,865,405	191,144	3,640,118	49,457	226,918	7,514,614	4,300,815	1,220,993	3,077,859	—436,610
Atlanta & West Point	93	61,152	47,844	127,976	14,506	23,353	6,778	44,583	2,390	5,881	97,491	30,485	7,345	23,092	24,864
Atlanta, Birmingham & Atlantic	640	223,304	50,192	298,495	45,159	53,288	15,654	145,224	28	10,330	269,684	28,810	13,700	15,110	—16,627
Atlantic Coast Line	4,780	2,376,415	736,439	3,376,810	408,859	652,451	62,217	1,317,043	10,761	87,737	2,535,123	841,686	175,000	665,648	—108,521
Baltimore & Ohio	4,545	8,712,530	1,576,718	11,272,774	1,316,241	2,164,520	206,332	4,413,308	71,440	241,912	8,403,755	2,869,019	394,628	2,472,877	—358,815
Baltimore & Ohio Chicago Terminal	79	.....	515	177,817	30,461	27,892	820	103,037	1,769	1,423	165,100	12,716	23,414	—10,698	—33,895
Baltimore, Chesapeake & Atlantic	87	69,672	34,653	110,335	6,164	16,960	1,624	60,217	.....	2,932	87,900	22,435	2,634	19,801	—1,452
Bangor & Aroostook	632	224,124	68,022	313,637	49,512	58,224	4,504	89,908	5,044	11,842	219,005	94,632	15,000	79,625	8,771
Belt Ry. Co. of Chicago	31	.....	.....	342,873	24,988	45,886	1,381	147,656	.....	6,851	226,764	116,109	14,461	101,647	23,359
Bessemer & Lake Erie	205	1,420,338	28,064	1,468,590	93,816	259,367	10,751	415,421	.....	19,389	773,023	695,567	60,865	634,702	—76,158
Bingham & Garfield	36	285,886	4,072	294,882	62,649	36,371	1,043	39,500	82	3,422	143,066	151,815	19,397	132,418	—31,815
Birmingham Southern	45	63,309	1,903	89,531	12,664	26,143	804	47,186	.....	4,182	90,979	—1,449	2,455	—3,904	—17,191
Boston & Maine	2,306	2,994,621	1,372,211	4,982,671	554,512	723,794	39,190	2,465,759	24,808	130,919	3,938,982	1,043,689	171,286	872,403	—540,577
Buffalo & Susquehanna R. R. Corporation	253	148,935	5,428	157,424	26,370	32,231	1,967	47,504	.....	6,015	114,087	43,337	15,500	27,837	4,197
Buffalo, Rochester & Pittsburgh	586	1,177,911	102,048	1,345,335	128,941	353,471	14,548	459,950	2,084	29,666	988,662	356,673	33,000	323,673	80,848
Carolina, Clinchfield & Ohio	283	329,182	23,422	359,810	40,619	55,415	16,171	75,798	.....	13,836	201,496	158,314	13,400	144,914	29,916
Carolina, Clinchfield & Ohio of S. C.	18	14,465	1,280	16,370	1,104	125	2,595	4,978	.....	1,237	10,039	6,330	600	5,730	2,792
Central of Georgia	1,919	806,985	316,097	1,249,991	185,196	231,105	40,452	407,785	1,521	45,529	905,858	344,133	64,328	279,047	103,081
Central New England	301	452,891	32,075	504,580	96,049	42,329	1,443	123,129	2,390	9,391	274,677	229,903	19,600	210,182	71,046
Charleston & Western Carolina	342	139,356	34,032	183,475	22,576	24,248	4,628	61,690	.....	3,928	117,072	66,402	6,500	59,898	64,509
Chesapeake & Ohio Lines	2,379	3,565,765	676,995	4,624,409	633,945	982,329	52,627	1,509,000	30,935	86,143	3,292,306	1,332,102	192,662	1,139,176	—357,123
Chicago & Alton	1,053	1,267,956	431,530	1,821,488	193,245	333,267	42,636	602,328	12,950	35,459	1,211,696	609,792	55,400	554,150	80,225
Chicago & Eastern Illinois	1,131	1,378,343	273,674	1,797,834	225,619	404,653	27,481	666,330	7,890	44,372	1,374,136	423,698	71,250	352,207	22,474
Chicago & North Western	8,107	6,581,790	2,132,633	9,718,663	1,573,105	1,459,926	116,713	3,568,100	46,337	195,906	6,951,402	2,767,261	425,000	2,341,340	2,723
Chicago Junction	13	.....	.....	271,800	32,768	21,660	1,257	136,812	20,095	5,555	218,146	53,654	4,084	49,570	5,409
Chicago, Milwaukee & St. Paul	10,221	6,397,586	1,934,078	9,410,567	1,045,189	1,388,436	137,421	3,737,895	68,795	191,383	6,544,674	2,865,892	545,620	2,318,821	430,554
Chicago, Peoria & St. Louis	255	155,271	23,417	187,367	22,350	37,850	5,792	76,014	.....	5,682	147,689	39,678	7,283	32,395	10,738
Chicago, Rock Island & Gulf	476	217,700	62,175	300,131	39,518	49,140	10,859	96,903	1,187	9,348	206,955	93,357	13,207	80,113	32,590
Chicago, Rock Island & Pacific	7,689	4,618,348	1,833,133	6,975,662	967,374	1,452,955	130,182	2,567,790	44,170	287,142	5,428,016	1,547,645	308,686	1,226,106	1,834,171
Chicago, St. Paul, Minn. & Omaha	1,752	1,124,035	507,280	1,792,920	264,154	219,863	30,414	715,863	14,321	45,411	1,288,139	504,780	110,698	392,532	—71,274
Cincinnati, Hamilton & Dayton	528	810,042	110,729	1,045,142	114,298	198,529	16,412	402,425	2,894	17,544	751,202	293,940	36,831	256,807	43,509
Cincinnati, Indianapolis & Western	322	161,782	47,783	229,780	33,435	37,145	6,193	89,602	580	7,657	174,556	55,223	10,166	45,058	—10,077
Cincinnati, New Orleans & Texas Pacific	337	844,207	222,816	1,147,149	53,703	258,875	25,357	326,892	4,488	21,399	689,970	457,178	51,000	406,140	295,527
Cincinnati Northern	245	216,624	14,353	238,675	35,582	39,607	3,073	78,627	.....	3,050	157,760	80,914	7,000	73,914	28,621
Cleveland, Cincinnati, Chic. & St. Louis	2,386	3,028,208	1,043,287	4,491,251	407,411	763,688	79,391	1,654,192	29,563	86,153	3,018,517	1,472,733	160,000	1,312,173	216,011
Coal & Coke	197	89,161	19,354	112,388	22,755	26,114	1,237	39,568	.....	3,084	92,760	19,628	5,000	14,628	6,684
Colorado Midland	338	96,247	12,585	117,429	26,421	26,092	6,232	50,348	850	3,470	113,412	4,017	6,781	—2,764	.....
Colorado & Southern	1,103	695,647	148,903	899,028	98,979	164,774	12,974	273,292	5,817	27,280	583,115	315,913	45,000	270,909	134,066
Colorado & Wyoming	43	39,815	2,708	112,511	11,771	15,907	190	33,783	.....	5,630	67,280	45,231	3,308	41,923	—5,280
Cripple Creek & Colorado Springs	87	82,135	13,159	97,788	4,805	10,733	1,590	23,556	.....	3,142	43,829	53,960	3,000	53,959	—9,776
Cumberland Valley	164	357,097	58,899	436,708	38,283	36,296	4,085	135,994	678	12,724	227,092	209,616	14,847	194,769	65,265
Delaware & Hudson Co.—R. R. Dept.	878	2,282,727	252,239	2,685,809	244,807	486,956	24,388	1,026,743	17,103	94,564	1,889,481	796,327	62,200	734,127	73,967
Delaware, Lackawanna & Western	955	3,946,222	784,368	5,253,803	503,566	720,020	85,773	1,884,777	46,194	93,487	3,331,510	1,922,293	261,866	1,660,419	249,638
Denver & Rio Grande	2,578	1,832,817	369,510	2,352,090	365,116	432,864	41,908	680,274	33,725	75,037	1,627,512	724,577	88,011	636,285	—116,506
Denver & Salt Lake	255	155,326	29,568	190,517	38,074	50,971	2,755	86,601	.....	4,986	183,387	7,130	8,250	—1,121	—43,721
Detroit & Mackinac	382	73,779	28,425	110,924	14,795	21,973	2,422	43,739	150	4,798	87,879	23,045	8,000	15,045	—5,659
Detroit & Toledo Shore Line	80	148,199	.....	148,920	7,837	8,448	1,687	53,148	.....	3,338	74,460	74,459	7,041	67,330	8,984
Detroit, Toledo & Ironton	441	197,391	11,453	225,226	33,074	36,948	4,724	116,067	.....	8,105	198,918	26,308	8,000	18,174	26,412
Duluth & Iron Range	270	906,691	19,337	951,449	129,963	101,260	1,328	213,257	1,853	13,679	461,342	490,107	47,816	442,291	—136,635
Duluth, Missabe & Northern	414	1,990,550	32,982	2,124,430	184,410	112,188	2,831	351,480	1,366	40,277	692,552	1,431,877	109,528	1,322,349	73,658
Duluth, Winnipeg & Pacific	191	102,795	20,939	131,367	23,794	18,612	3,312	69,510	.....	7,351	122,579	8,788	6,568	2,219	—41,345
El Paso & Southwestern Co.	1,028	824,886	290,637	1,173,468	127,509	147,346	20,735	327,765	7,217	26,837	657,410	576,057	38,642	477,412	536,805
Elgin, Joliet & Eastern	804	1,321,998	1	1,398,626	89,848	309,716	7,612	445,317	.....	25,021	877,255	521,371	47,935	473,436	137,415
Florida East Coast	765	389,813	149,408	652,308	58,834	81,357	8,971	216,665	4,640	17,316	359,138	293,170	34,309	258,766	75,795
Fort Worth & Denver City	454	329,137	127,359	485,613	42,895	86,894	9,353	143,290	2,951	17,883	303,266	182,347	20,000	162,347	10,457
Galveston, Harrisburg & San Antonio	1,361	1,068,462	332,987	1,502,075	174,996	216,918	30,445	470,266	11,238	40,019	933,841	568,233	56,027	511,768	212,838
Galveston Wharf	14	.....	.....	69,540	816	599	756	21,221	22,631	908	46,930	22,609	12,000	10,609	—31,724
Georgia, Southern & Florida	402	130,215	61,947	212,191	29,215	69,815	7,519	78,255	.....	9,538	194,345	17,846	11,478	6,189	21,063
Grand Rapids & Indiana	575	362,297	132,078	545,588	68,114	110,968	11,920	253,527	1,257	18,489	464,326	81,262	21,060	60,194	89,541
Great Northern	8,248	6,322,888	1,419,249	8,511,030	1,274,605	1,063,330	106,066	2,510,018	95,313	127,633	5,154,058	3,356,971	457,196	2,899,481	496,043
Gulf & Ship Island	307	131,601	28,548	170,587	30,267	26,515	2,972	57,273	271	8,835	126,047	44,539	10,733	33,801	20,897
Gulf, Colorado & Santa Fe	1,937	1,002,745	270,320	1,380,942	268,767	163,203	29,857	420,397	.....	48,611	928,811	452,130	66,983	385,040	348,124
Gulf, Mobile & Northern	402	151,134	22,080	183,175	23,574	34,889	3,644	56,993	5	8,378	127,484	55,691	8,420	47,270	5,295
Hocking Valley	349	826,022	82,104	982,616	88,988	180,035	9,493	335,799	.....	18,413	632,573	350,043	49,000	301,019	124,296
Houston, East & West Texas	191	90,905	33,586	134,334	18,379	15,154	2,487	39,210	897	3,082	79,198	55,137	7,487	47,439	6,581
Houston & Texas Central	918	417,358	128,145	592,797	67,781	80,351	18,910	182,547	5,087	18,536	371,945	220,852	33,918	186,318	77,122
Illinois Central	4,765	5,260,374	1,371,723	7,179,177	997,950	1,377,572	106,055	2,307,860	44,078	168,851	4,980,796	2,198,381	477,300	1,719,671	230,273
Indiana Harbor Belt	109	.....	.....	467,221	60,617	63,634	2,581	217,703	.....	10,827	355,363	111,857	8,921	102,928	89,193
International & Great Northern	1,159	673,036	234,612	973,206	105,825	153,266	21,738	320,188	5,324	35,618	638,437	334,769	30,000	304,462	280,227
Kanawha & Michigan	177	294,981	31,748	337,291	39,282	51,141	3,061	93,929	59	7,693	195,164	142,127	16,508	125,619	22,172
Kansas City, Mexico & Orient of Texas	466	86,298	16,454	108,043	23,227	29,161	4,138	53,598	.....	5,779	115,903	—7,860	5,000	—12,860	1,508
Kansas City Southern	755	782,546	149,200	1,009,258	104,369	151,777	26,198	318,490	.....	38,099	637,888	371,370	50,659	320,475	32,849

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1917—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Lake Erie & Western	900	$630,407	$54,183	$723,918	$85,088	$80,359	$14,859	$264,233	.....	$16,454	$460,994	$262,923	$30,000	$2,328,864	$342,265
Lehigh & Hudson River	96	172,749	4,084	195,649	10,224	24,322	1,555	67,681	.....	7,128	110,912	84,736	5,600	79,136	89,287
Lehigh & New England	296	303,173	1,238	315,650	44,046	43,017	2,485	96,042	.....	9,211	194,772	120,878	10,335	110,543	87,582
Lehigh Valley	1,443	4,315,073	420,696	5,113,085	555,519	815,488	74,368	1,977,009	$16,862	106,826	3,545,258	1,567,827	206,000	1,361,294	211,933
Long Island	397	370,341	925,559	1,489,218	156,303	145,540	17,689	580,793	6,622	39,229	944,631	544,586	76,143	467,813	498,745
Los Angeles & Salt Lake	1,154	771,156	348,184	1,206,612	115,482	133,777	33,517	309,269	21,606	23,176	631,764	574,848	55,225	519,613	77,401
Louisiana & Arkansas	302	110,353	19,322	133,848	21,612	22,269	4,121	39,593	.....	4,382	91,339	42,508	10,404	32,152	10,779
Louisiana Ry. & Nav. Co	342	136,496	28,594	176,414	28,217	28,854	7,172	70,931	.....	6,503	141,677	34,737	19,192	15,540	—20,675
Louisiana Western	208	185,375	69,195	271,310	21,236	35,319	7,569	56,355	1,917	7,634	130,030	141,279	25,432	115,711	78,255
Louisville, Henderson & St. Louis	199	130,300	39,530	178,345	18,292	30,199	4,366	69,930	.....	3,442	126,232	52,113	4,300	47,812	588
Maine Central	1,216	743,331	354,819	1,217,358	112,464	143,440	14,047	516,281	3,100	27,424	816,442	400,916	58,741	342,103	341,797
Michigan Central	1,861	2,771,414	1,053,932	4,350,707	544,893	644,481	68,509	1,735,510	64,938	82,220	3,140,554	1,210,152	188,000	1,020,235	—198,918
Midland Valley	384	193,839	48,401	247,108	86,054	28,004	3,262	73,224	.....	8,756	199,303	47,805	5,137	42,652	—18,334
Minneapolis & St. Louis	1,647	711,872	169,875	937,455	150,793	86,454	16,412	352,968	90	24,321	630,986	306,469	45,071	261,303	—19,351
Minn., St. Paul & S. S. Marie	4,227	2,475,666	575,311	3,302,933	361,636	371,716	52,958	1,064,742	18,478	66,697	1,931,814	1,371,119	135,716	1,234,935	87,550
Missouri & North Arkansas	365	63,439	31,757	103,043	21,631	19,471	3,806	39,517	359	4,803	89,590	13,452	4,800	8,516	7,452
Missouri, Kansas & Texas System	3,865	2,385,165	836,107	3,456,984	497,069	568,482	67,362	1,213,917	25,977	95,731	2,468,444	988,540	144,751	843,341	512,944
Missouri, Oklahoma & Gulf	332	111,418	21,983	154,465	20,338	28,210	4,053	57,925	91	7,349	117,967	36,498	9,364	27,038	29,364
Mobile & Ohio	1,160	1,047,168	121,468	1,234,518	103,593	237,089	37,052	399,231	2,716	32,433	804,783	429,735	52,915	376,673	32,048
Monongahela	108	170,462	13,811	187,784	35,480	13,865	760	53,933	.....	4,510	108,551	79,233	6,000	73,233	—5,391
Monongahela Connecting	6	.....	.....	138,037	31,092	26,172	334	60,729	.....	3,901	122,228	15,809	1,894	13,915	—62,488
Morgan's La. & Tex. R. R. & S. S. Co	401	396,429	112,270	544,156	55,188	79,430	11,731	141,613	2,337	11,913	302,211	241,946	46,592	195,226	125,623
Nashville, Chattanooga & St. Louis	1,236	789,844	255,923	1,140,266	115,290	253,360	50,168	437,778	14,530	38,136	908,825	231,440	30,000	201,033	213,946
New Orleans & North Eastern	203	315,808	88,160	415,827	41,879	91,731	9,261	125,112	1,515	7,577	277,077	138,749	32,000	105,624	4,237
New Orleans Great Northern	285	138,704	29,790	174,413	14,893	26,528	2,927	47,762	256	7,252	99,621	74,793	6,176	68,600	—12,306
New Orleans, Texas & Mexico	191	78,339	21,922	104,680	10,860	17,273	3,961	29,542	.....	5,692	67,330	37,350	1,400	35,938	126,365
New York, Chicago & St. Louis	570	1,257,367	153,768	1,485,673	133,876	218,477	46,918	634,425	5,383	36,283	1,074,527	411,145	50,000	361,145	323,414
New York, New Haven & Hartford	1,997	3,626,097	2,808,160	7,404,054	769,177	1,126,277	57,807	3,021,374	106,777	220,758	5,302,033	2,102,021	280,000	1,819,614	—311,270
New York, Ontario & Western	568	531,470	141,029	804,718	100,021	125,751	8,311	288,601	.....	20,551	543,235	261,484	25,000	236,484	—85,841
New York, Philadelphia & Norfolk	112	421,804	67,254	534,287	43,998	83,728	4,924	194,807	6,893	7,168	341,520	192,767	14,150	178,617	198,340
New York, Susquehanna & Western	135	242,091	49,662	330,008	23,104	31,552	2,749	152,652	.....	6,015	215,955	114,053	16,167	97,886	41,137
Norfolk & Western	2,085	4,891,852	522,586	5,593,349	528,136	1,060,293	73,633	1,823,391	10,252	102,065	3,588,575	2,004,774	253,000	1,751,638	—249,015
Norfolk Southern	908	379,025	97,945	504,079	76,703	66,762	8,583	156,258	109	19,217	327,633	176,446	15,015	161,360	14,907
Northern Pacific	6,525	6,219,690	1,512,563	8,371,745	1,243,991	892,403	111,150	2,326,571	112,924	129,711	4,684,263	3,687,482	673,695	3,012,664	960,086
Northwestern Pacific	507	197,392	211,297	458,409	51,867	45,516	6,732	145,950	1,009	9,323	260,385	198,025	18,718	179,307	—87,633
Panhandle & Santa Fe	670	469,474	88,071	581,549	121,750	95,446	4,076	171,554	.....	11,782	386,235	195,314	37,350	157,892	13,222
Pennsylvania Company	1,754	5,738,426	1,203,644	7,718,600	863,339	1,258,413	79,013	2,892,120	48,237	161,074	5,299,661	2,418,939	365,436	2,053,499	2,127,109
Pennsylvania Railroad	4,536	15,680,268	4,333,735	22,197,160	2,571,677	4,424,389	210,540	8,819,105	337,901	538,220	16,888,737	5,308,422	824,276	4,482,096	5,114,729
Peoria & Pekin Union	19	14,767	5,828	102,946	13,117	14,327	7	56,311	.....	3,453	87,216	15,730	8,000	7,729	—18,765
Pere Marquette	2,250	1,334,238	351,584	1,915,584	253,630	208,136	38,579	735,235	5,495	51,304	1,291,454	624,130	55,960	568,170	392,206
Philadelphia, Baltimore & Washington	717	1,498,142	1,047,083	2,809,630	299,970	526,734	27,711	1,156,563	237	61,305	2,068,959	740,670	74,915	665,706	531,940
Pittsburgh & Lake Erie	224	1,925,541	185,665	2,300,514	253,095	374,905	17,440	622,191	4,647	38,068	1,310,348	990,166	85,200	904,966	43,571
Pittsburgh, Cincinnati, Chic. & St. L.	2,399	4,510,980	1,177,787	6,369,058	668,924	1,261,174	98,534	2,380,378	44,815	139,708	4,593,423	1,775,635	238,219	1,537,416	479,726
Richmond, Fredericksburg & Potomac	87	248,118	134,875	430,967	30,298	46,708	3,170	132,056	4,031	8,324	224,589	206,377	13,686	192,686	147,440
Rutland	468	210,901	104,468	374,891	47,697	56,477	10,976	151,380	1,158	8,976	276,666	98,225	17,864	80,360	—4,343
St. Joseph & Grand Island	258	155,456	24,271	195,944	87,538	28,225	3,255	75,695	3,168	5,555	203,436	—7,492	8,830	—16,321	—56,010
St. Louis, Brownsville & Mexico	548	154,806	118,340	296,070	50,201	36,602	10,193	85,167	.....	11,011	189,058	107,012	8,000	98,485	75,607
St. Louis, Merchant's Bridge Terminal	9	.....	403	252,926	31,824	12,830	1,058	123,249	.....	13,697	182,660	70,266	7,516	62,749	28,178
St. Louis, San Francisco & Texas	190	61,294	14,926	85,453	26,326	14,491	2,376	40,547	.....	5,915	89,655	—4,202	1,491	—5,693	9,923
San Antonio & Aransas Pass	726	199,158	78,743	300,344	38,251	58,505	7,467	139,470	.....	13,320	256,347	43,997	15,000	28,997	28,472
Seaboard	3,461	1,536,748	500,463	2,265,152	274,112	395,399	75,959	816,289	14,596	64,981	1,638,651	626,501	112,500	513,572	465,603
Southern	6,982	4,644,805	1,829,770	7,143,681	588,035	1,356,323	167,157	2,444,578	50,109	188,295	4,766,876	2,376,805	320,868	2,050,479	1,627,568
Southern in Mississippi	278	59,989	23,478	91,289	7,837	3,334	1,833	40,201	.....	3,789	56,997	34,292	12,347	21,921	7,190
Southern Pacific	7,104	8,337,223	2,704,488	12,077,822	1,004,550	1,454,607	184,160	3,905,650	178,019	257,200	6,945,958	5,131,864	568,761	4,559,484	551,001
Spokane, Portland & Seattle	555	443,914	163,237	651,617	79,076	46,397	8,427	149,952	4,954	13,036	301,523	350,094	58,300	291,736	147,379
Tennessee Central	294	100,064	35,133	144,278	26,494	24,663	4,867	53,622	.....	9,718	119,351	24,926	4,800	20,126	—16,728
Terminal R. R. Ass'n. of St. Louis	36	.....	783	494,783	55,769	18,644	1,120	112,433	1,826	16,654	206,446	288,336	34,666	253,670	125,900
Texas & New Orleans	468	352,663	109,260	504,238	31,897	85,714	7,935	146,762	11,658	11,425	295,390	208,848	23,584	184,979	74,413
Texas & Pacific	1,947	1,146,118	494,232	1,760,496	155,106	196,749	37,910	667,099	11,147	61,382	1,126,478	634,018	85,000	548,468	285,474
Toledo & Ohio Central	435	636,981	55,002	742,652	117,423	122,884	7,138	268,024	1,849	10,291	527,611	215,040	35,361	179,678	112,706
Toledo, Peoria & Western	248	65,069	39,308	122,163	23,080	28,778	2,404	47,478	.....	6,280	107,992	14,170	7,500	6,670	—10,411
Toledo, St. Louis & Western	455	521,111	38,290	587,628	95,281	91,004	18,164	222,436	.....	9,108	435,712	151,915	20,000	131,879	189,755
Trinity & Brazos Valley	369	58,991	11,073	74,430	19,286	25,572	2,503	34,935	.....	7,320	89,616	—15,186	5,160	—20,358	12,491
Union R. R. of Baltimore	8	142,975	35,346	180,653	8,158	.....	.....	7,578	.....	2,457	18,193	162,459	11,309	151,149	137,242
Union R. R. of Pennsylvania	35	.....	.....	596,692	52,281	170,887	126	237,428	.....	5,625	466,272	130,420	13,335	117,084	—106,206
Vicksburg, Shreveport & Pacific	171	87,628	43,384	150,493	13,100	34,171	5,171	51,263	1,663	5,823	109,207	41,286	10,075	30,715	22,460
Virginian	512	814,541	43,283	906,613	69,655	131,514	6,064	221,870	20,292	14,385	462,183	444,430	39,000	405,430	128,276
Wabash	2,519	2,421,793	674,104	3,381,519	369,036	410,207	85,727	1,349,159	20,519	76,797	2,306,163	1,075,356	107,199	967,957	95,836
Washington Southern	35	78,683	84,305	210,545	9,911	17,081	1,308	63,627	1,421	3,697	97,048	113,496	6,789	106,707	57,223
West Jersey & Seashore	359	216,344	434,741	710,580	111,684	100,018	11,213	286,051	4,686	18,150	531,806	178,774	41,152	137,608	133,549
Western Maryland	775	936,615	92,392	1,101,587	132,507	240,354	21,564	371,776	13,721	29,975	809,500	292,087	36,590	255,587	—115,551
Western Pacific	958	726,715	143,852	902,636	141,965	75,567	20,911	223,461	13,278	19,312	489,577	413,058	36,279	376,730	131,425
Western Ry. of Alabama	133	64,593	42,888	119,907	13,420	25,200	6,443	41,700	2,163	5,024	93,949	25,958	6,150	19,808	—9,045
Wheeling & Lake Erie	512	933,650	54,883	1,086,880	129,819	159,508	8,139	373,258	1,922	18,873	691,518	395,362	44,304	351,058	—4,864
Yazoo & Mississippi Valley	1,382	1,095,732	228,871	1,395,274	265,672	221,138	21,613	461,985	2,376	36,036	1,002,679	392,594	101,000	291,538	—47,809

REVENUES AND EXPENSES OF RAILWAYS

SIX MONTHS OF CALENDAR YEAR, 1917

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.			
Alabama Great Southern	312	$2,306,229	$714,994	$3,280,863	$385,728	$696,643	$101,624	$988,264	$16,704	$65,939	$2,253,282	$1,027,580	$131,071	$896,298	$808,097
Alabama & Vicksburg	143	649,947	214,600	957,577	126,118	182,291	29,641	338,316	7,906	38,312	720,594	236,983	60,004	176,399	28,721
Arizona Eastern	378	1,882,702	315,549	2,352,170	269,485	208,213	16,274	485,815	42,241	85,245	1,106,206	1,245,964	121,940	1,123,525	451,002
Atchison, Topeka & Santa Fe	8,639	47,595,378	14,423,834	67,198,183	7,350,121	11,386,465	1,164,413	21,005,239	161,248	1,356,049	42,215,371	24,982,811	3,818,915	21,153,486	2,212,664
Atlanta & West Point	93	406,341	281,457	792,747	86,568	140,033	42,302	266,967	15,021	30,852	581,733	211,014	43,620	167,203	41,062
Atlanta, Birmingham & Atlantic	640	1,470,390	272,579	1,895,814	262,079	305,143	94,945	853,670	228	68,355	1,584,420	311,394	82,200	228,432	52,386
Atlantic Coast Line	4,780	14,647,519	5,640,013	22,121,243	2,436,042	3,531,908	395,196	7,631,314	104,583	490,227	14,571,618	7,549,625	1,077,000	6,466,565	214,245
Baltimore & Ohio	4,545	48,034,335	8,094,155	61,170,347	6,693,517	12,097,515	1,161,424	24,877,634	411,526	1,489,524	46,723,225	14,446,622	2,081,345	12,359,522	191,911
Baltimore & Ohio Chicago Terminal	79	.....	2,786	980,179	105,182	180,024	5,767	661,710	9,508	35,107	992,838	—12,659	139,034	—151,929	—205,911
Baltimore, Chesapeake & Atlantic	87	310,693	132,297	467,386	41,051	79,770	7,654	288,381	.....	16,072	432,929	34,456	14,432	20,023	—16,307
Bangor & Aroostook	632	1,910,625	368,155	2,395,247	311,233	373,905	24,152	763,278	25,112	73,323	1,570,975	824,272	90,000	734,248	—21,735
Belt Ry. Co. of Chicago	31	.....	.....	1,887,501	132,213	270,539	8,410	930,858	.....	40,905	1,382,926	504,574	83,317	421,257	14,438
Bessemer & Lake Erie	205	4,588,744	160,201	4,869,138	491,902	1,443,966	63,368	1,661,117	.....	100,672	3,686,337	1,182,801	171,281	1,011,484	—570,340
Bingham & Garfield	36	1,455,671	31,185	1,512,858	176,871	184,335	7,160	230,085	417	20,794	619,512	893,345	107,067	786,279	70,525
Birmingham Southern	44	411,219	11,991	568,692	95,667	143,539	4,835	273,872	.....	25,076	542,989	25.703	16,679	9,024	—85,506
Boston & Maine	2,306	17,134,388	7,676,032	28,049,619	2,992,521	4,191,877	204,610	14,425,637	134,922	709,520	22,659,087	5,390,532	1,028,311	4,362,220	—2,617,630
Buffalo & Susquehanna R. R. Corporation	253	779,395	36,367	830,311	131,316	234,974	9,406	269,204	.....	36,826	681,725	148,585	28,500	120,084	—59,189
Buffalo, Rochester & Pittsburgh	586	5,952,652	595,172	6,783,538	667,549	1,804,884	94,386	2,704,960	9,130	169,436	5,450,348	1,333,189	182,000	1,151,185	—347,746
Carolina, Clinchfield & Ohio	283	1,814,717	125,521	1,987,616	201,082	308,335	98,643	441,378	.....	77,973	1,125,276	862,340	80,400	781,934	83,453
Carolina, Clinchfield & Ohio of S. C	18	92,140	7,505	103,568	10,484	623	15,226	21,913	.....	5.864	54,109	49,459	3,600	45,825	1,370
Central of Georgia	1,919	4,679,278	1,701,473	7,176,773	1,061,170	1,283,394	242,542	2,413,732	12,657	249,818	5,243,502	1,933,272	379,967	1,546,704	242,007
Central New England	301	2,411,795	174,695	2,718,235	470,411	263,569	6,848	921,140	4,569	48,698	1,714,956	1,003,279	112,400	890,684	36,419
Charleston & Western Carolina	342	846,836	182,126	1,078,234	171,672	134,076	26,503	395,307	.....	22,717	750,047	328,186	39,000	288,213	—27,061
Chesapeake & Ohio Lines	2,379	20,818,694	3,404,893	26,032,212	3,209,178	5,284,234	347,496	8,814,455	174,319	544,384	18,360,839	7,671,373	871,912	6,797,127	—402,443
Chicago & Alton	1,053	6,963,908	2,075,153	9,730,862	989,790	1,910,891	235,090	3,529,946	67,307	198,816	6,921,100	2,809,762	323,116	2,484,837	415,086
Chicago & Eastern Illinois	1,132	7,653,944	1,573,141	10,047,319	1,118,421	2,466,941	165,520	3,836,008	59,936	238,356	7,859,453	2,187,865	399,750	1,786,265	351,985
Chicago & North Western	8,107	33,663,990	10,808,541	49,803,805	6,579,092	8,257,378	671,648	20,437,052	392,629	1,174,547	37,455,337	12,348,468	2,550,000	9,794,065	—1,412,141
Chicago Junction	13	.....	.....	1,606,891	189,366	149,089	7,494	904,293	141,943	33,351	1,425,435	181,456	17,133	164,356	—65,153
Chicago, Milwaukee & St. Paul	10,221	37,064,172	9,351,438	52,282,357	4,825,735	9,249,359	881,790	22,606,469	379,808	1,016,853	38,605,725	13,676,632	2,827,911	10,834,639	—1,371,839
Chicago, Peoria & St. Louis	255	863,722	130,353	1,043,740	123,828	214,254	35,782	443,082	.....	35,201	852,147	191,593	51,239	140,335	22,638
Chicago, Rock Island & Gulf	476	1,338,085	374,739	1,838,402	265,138	264,833	61,453	617,987	7,235	55,509	1,271,962	566,439	63,207	503,053	—177,913
Chicago, Rock Island & Pacific	7,662	27,571,212	9,586,255	40,340,759	5,273,345	7,857,305	816,347	15,554,847	264,893	1,117,826	30,751,645	9,589,114	1,879,410	7,693,422	—1,101,438
Chicago, St. Paul, Minn. & Omaha	1,752	6,470,256	2,541,429	9,869,446	1,160,158	1,420,511	174,916	4,122,856	93,637	269,394	7,234,813	2,634,633	587,641	2,043,696	—514,191
Cincinnati, Hamilton & Dayton	528	4,068,430	588,275	5,258,478	713,991	1,076,091	90,334	2,412,580	18,176	131,511	4,432,221	826,257	207,300	617,838	—170,618
Cincinnati, Indianapolis & Western	322	971,605	255,949	1,349,210	162,679	218,729	42,413	574,971	3,077	45,627	1,047,267	301,944	58,996	242,947	1,215
Cincinnati, New Orleans & Texas Pacific	337	4,538,946	1,331,657	6,313,485	502,825	1,462,520	175,397	1,959,984	48,499	117,889	4,266,370	2,047,115	256,900	1,790,164	71,538
Cincinnati Northern	246	1,000,675	83,979	1,120,515	173,426	206,816	18,424	454,262	.....	19,478	871,185	249,330	42,000	207,327	—18,856
Cleveland, Cincinnati, Chic. & St. Louis	2,387	17,155,933	5,188,948	24,577,351	2,163,219	4,575,477	487,907	10,101,713	158,347	521,347	17,996,338	6,581,013	960,000	5,616,500	—600,028
Coal & Coke	197	509,002	101,253	634,959	112,466	163,012	7,528	253,927	.....	17,329	554,264	80,695	30,000	50,695	—16,388
Colorado & Southern	1,103	3,959,345	759,341	5,091,808	517,469	880,573	66,571	1,569,136	28,855	156,726	3,219,331	1,872,477	269,737	1,602,412	469,016
Colorado & Wyoming	43	206,279	14,655	607,937	50,429	87,848	703	196,829	.....	24,465	360,374	247,564	19,777	227,786	—13,625
Cripple Creek & Colorado Springs	87	525,589	72,254	611,286	52,271	71,550	8,830	20,856	125,960	19,744	299,212	312,075	18,000	294,075	—16,765
Cumberland Valley	164	1,854,597	330,322	2,289,623	171,948	198,425	25,910	722,267	4,681	62,097	1,178,694	1,110,929	83,002	1,027,926	190,758
Delaware, Lackawanna & Western	955	20,690,966	4,121,432	27,738,569	2,212,480	4,309,050	461,514	10,190,065	234,776	529,170	17,924,218	9,814,351	1,541,196	8,269,008	—334,379
Delaware & Hudson	878	11,941,439	1,293,724	13,983,804	1,310,670	2,989,265	155,413	5,915,800	102,052	513,968	10,975,219	3,026,584	373,200	2,650,433	—1,202,632
Denver & Rio Grande	2,578	10,683,811	1,940,620	13,490.305	1,543,367	2,458,295	241,887	4,254,077	176,240	405,999	9,071,885	4,418,420	541,011	3,876,510	—188,472
Denver & Salt Lake	255	735,771	131,701	897,581	186,844	271,894	13,226	486,658	.....	30,922	989,534	—91,953	49,500	—141,464	—244,143
Detroit & Mackinac	383	436,865	153,720	637,538	78,162	140,178	12,708	242,492	150	23,342	497,034	140,505	48,064	92,440	—47,824
Detroit & Toledo Shore Line	80	921,112	.....	935,821	47,102	57,238	10,375	295,611	.....	19,856	430,182	505,639	44,554	460,998	—34,549
Detroit, Toledo & Ironton	441	1,112,722	68,129	1,268,393	138,206	186,395	25,964	741,440	.....	46,456	1,138,461	129,932	48,000	81,505	142,878
Duluth & Iron Range	269	2,051,277	124,232	2,261,672	526,618	444,986	8,055	725,095	9,623	69,924	1,784,302	477,370	118,080	359,290	—521,227
Duluth, Missabe & Northern	414	3,711,145	189,576	4,164,685	889,369	656,706	19,122	1,018,860	7,908	175,726	2,767,692	1,396,993	215,630	1,181,363	—801,053
Duluth, Winnipeg & Pacific	191	947,109	147,818	1,122,717	98,004	134,568	15,800	465,323	4,403	43,077	761,176	361,540	56,118	305,423	—22,053
El Paso & Southwestern Co	1,028	5,634,581	1,268,458	7,258,286	654,831	834,313	125,473	1,908,853	43,037	165,416	3,731,923	3,526,364	231,857	3,294,404	779,031
Elgin, Joliet & Eastern	802	7,119,444	101	7,639,440	664,492	2,108,843	47,800	2,678,324	.....	129,708	5,626,442	2,012,997	287,735	1,725,202	—795,680
Florida East Coast	765	2,452,568	1,690,963	4,863,286	394,537	479,892	56,350	1,246,856	40,028	98,916	2,239,673	2,623,613	224,279	2,399,159	93,894
Fort Worth & Denver City	454	2,055,536	691,663	2,923,024	300,975	501,223	43,596	880,064	15,642	108,678	1,850,177	1,072,847	109,500	963,271	44,609
Galveston, Harrisburg & San Antonio	1,361	6,712,911	2,237,930	9,462,119	1,179,932	1,259,031	203,950	3,079,232	73,101	239,117	5,991,938	3,470,181	328,021	3,136,231	2,027,753
Galveston Wharf	14	.....	.....	598,234	7,468	6,759	2,183	181,575	138,582	4,328	340,894	257,339	64,500	192,839	—80,996
Georgia, Southern & Florida	402	798,333	386,840	1,360,314	189,820	308,840	45,150	505,844	5,154	57,042	1,111,800	248,514	70,157	177,583	—29,205
Grand Rapids & Indiana	575	2,125,543	687,676	3,072,015	389,045	594,180	59,110	1,459,355	3,489	112,965	2,618,142	453,873	144,857	308,725	—129,271
Great Northern	8,205	29,021,389	7,046,471	40,002,487	6,133,090	6,053,439	640,523	14,326,009	514,769	721,616	28,160,429	11,842,058	2,549,964	9,289,631	—211,993
Gulf & Ship Island	307	738,670	172,785	973,786	149,202	147,995	19,142	312,334	1,911	48,971	678,543	295,244	57,014	238,048	96,500
Gulf, Colorado & Santa Fe	1,937	6,049,091	1,426,866	8,027,072	1,539,935	1,185,301	180,567	2,697,519	.....	340,215	5,931,878	2,095,194	364,395	1,728,383	615,979
Gulf, Mobile & Northern	402	813,197	143,504	1,020,487	143,799	171,340	23,694	330,533	43	49,635	719,044	301,443	50,525	250,918	—32,522
Hocking Valley	350	4,005,616	438,613	4,716,200	422,713	1,059,434	53,829	1,635,585	.....	111,788	3,282,995	1,433,205	294,000	1,138,793	493,007
Houston, East & West Texas	191	647,564	176,850	884,733	101,936	104,809	13,519	285,097	4,667	19,099	528,588	356,146	40,635	314,758	88,608
Houston & Texas Central	918	2,549,703	758,430	3,597,711	504,999	488,591	106,354	1,177,252	28,416	113,949	2,415,319	1,182,392	196,554	983,486	530,687
Illinois Central	4,766	30,658,517	7,642,681	41,619,163	5,402,510	8,316,343	656,538	13,517,241	273,078	990,342	29,036,117	12,583,045	2,923,096	9,652,016	2,404,163
Indiana Harbor Belt	109	.....	.....	2,653,306	285,969	335,301	17,345	1,305,713	.....	58,434	2,002,762	650,544	52,435	598,095	—72,430
International & Great Northern	1,159	4,000,099	1,235,822	5,640,443	744,120	886,155	140,622	2,160,917	32,229	184,875	4,076,827	1,563,616	219,638	1,342,200	694,884
Kanawha & Michigan	177	1,399,573	180,691	1,639,803	224,880	428,634	16,361	493,216	180	44,579	1,207,850	431,952	101,033	330,897	—243,940
Kansas City, Mexico & Orient of Texas	466	528,757	95,114	658,203	126,347	156,434	23,956	353,281	.....	29,071	689,089	—30,887	30,500	—61,507	21,955
Kansas City Southern	755	4,653,796	765,171	5,887,647	600,817	824,345	151,447	1,832,519	.....	207,831	3,605,970	2,281,677	303,956	1,975,426	392,100
Lake Erie & Western	900	3,504,104	316,094	4,016,579	426,577	624,989	80,217	1,572,983	.....	90,898	2,795,664	1,220,914	167,000	1,053,577	309

Public Service Commissions Pledge Co-operation

Letters received from public service commissions in all parts of the country indicate that a most encouraging response is being made to the recent plea of the Railroads' War Board, urging, on the part of public authorities, co-operation with the railroads in a suspension during the period of the war "of all efforts not designed to help directly in winning the war." Many public service commissions have also pledged their support to the railroads' campaign "to make one car do the work of two" by urging shippers to load cars to capacity and reduce delays in loading and unloading.

The states whose public service commissioners have replied to the appeal are Louisiana, Texas, Kansas, Indiana, Tennessee, New Jersey, Virginia, Massachusetts and Michigan.

The Railroad Commission of Texas, through its chairman, Allison Mayfield, said: "We thoroughly agree with all you have to say and pledge such co-operation as lies within our power."

From Indiana, E. I. Lewis, chairman of the public service commission, sent this message: "We already are frowning on requirements of railroads which are not absolutely necessary for national service or public safety. We hope that you will call on us at any time when we may be of service in the work that you have in hand. Permit me to say at this time that the railroad men in Indiana have been co-operating in the most exceptional and exemplary way in trying to solve the severe coal problem."

The Railroad Commission of Louisiana has sent circulars out urging shippers to co-operate in every way possible.

The Tennessee Railroad Commission is also co-operating with the railroads to eliminate unnecessary passenger trains.

Lo, the Poor Farmer!

A merchant in a Missouri town showed a farmer a buggy priced at $90, and the farmer kicked because twenty years ago his father bought one just like it for $60.

Then the merchant looked up the record of sale and found that the father had turned in 300 bushels of corn for that buggy, and he told the farmer's son to deliver to him 300 bushels of corn and he would give him:

1—$90 Buggy.	1—$ 3 Box of cigars.
1— 75 Wagon.	10 Worth of sugar.
1— 20 Suit of clothes.	10 Worth of tea.
1— 20 Dress.	100 Worth of gasolene.
1— 5 Baby dress.	15 Worth of lubricating oil.
1— 5 Crib.	

The total figures $365, as the value of 300 bushels of corn, and it is needless to say that the high cost of living disappeared from the farmer's mind and he bought the buggy.—St. Louis Lumberman.

Adamson Says His Law Not Being Complied With

Congressman Adamson, chairman of the House Committee on Interstate and Foreign Commerce, has issued a statement charging the railroads with failure to comply with the spirit of the Adamson "eight-hour" law. He said in part:

"The railroads by the connivance of the trainmen seem to be proceeding in the same old way. They are running heavy, long trains, letting them lie over at stations, for other trains to pass, when they break down, averaging 10 miles an hour, including stops and paying the men for time over eight hours a day, entirely ignoring the letter and spirit of the law.

"If the railroads would properly enforce the law, they would run an average of 12½ miles instead of 10 miles an hour, thereby without additional cost covering a division of 80 per cent of the cases in eight hours where 10 are now required. In the 20 per cent of cases where a division is more than 100 miles, overtime would be required as now, but no more overtime than now, and there would be no more cost for overtime.

"I think if the railroad and trainmen rely on the hope that any report of the Goethals commission made by observing present practices will ever be credited by the commission or by Congress, they will be wofully disappointed. The Goethals commission is required to observe the operation of the law for not less than six months, nor more than nine months. But it is impossible for such operation to begin until the railroads begin to enforce the law.

"If the railroad officials do not make reforms there will probably be other legislation. It may be that either the length and speed of trains will be directly regulated or authority will be conferred on the commission to control both; and the language of the law may be so plain that nobody can cavil or dispute it, in court or out, that men who operate trains involving the safety of life, limb and property shall not work over eight hours a day, except in cases of real emergency, which emergency does not grow out of collusion or regular practice, but arrives in spite of efforts to enforce the eight-hour day."

Railway Signal Association

Secretary C. C. Rosenberg announces that the board of direction has decided that the annual meeting of the association, to be held at the Hotel Traymore, Atlantic City, N. J., shall be confined to a two days' business meeting, Tuesday and Wednesday, September 18 and 19.

The business to be transacted is to deal with the conclusions of the several committees, on the subjects which have been presented by them, and which have been discussed at the last two meetings—Chicago in March and New York in June. The session each day will be from 9:30 a. m. to 6 p. m., with an intermission for luncheon.

National Association of Railway Commissioners

The twenty-ninth annual convention of the National Association of Railway Commissioners will meet in the hearing room of the Interstate Commerce Commission in the new building at the corner of Pennsylvania avenue and Eighteenth street N. W., Washington, D. C., on October 16, 1917, at 10 a. m., and will continue in session for four or five days.

Reports will be submitted by the following standing committees:

Executive Committee, Charles E. Elmquist of Minnesota, chairman.
Express and other contract carriers by rail, J. Prince Webster, Rate Expert, Georgia, chairman.
Safety of railroad operation, C. C. McChord, Interstate Commerce Commission.
Railroad service accommodations and claims, C. B. Garnett, Virginia.
Grade Crossings and trespassing on railroads, James B. Walker, Secretary, New York, First District.
Railroad rates, A. E. Helm, Commerce Counsel, Kansas.
Statistics and accounts of railroad companies, Arthur A. Lewis, Washington.
Car Service and demurrage, Frank H. Funk, Illinois.
Public utility rates, Thomas W. D. Worthen, New Hampshire.
Service of public utility companies, M. H. Aylesworth, Colorado.
Safety of operation of public utility companies, Frank R. Devlin, California.
Statistics and accounts of public utility companies, James O. Carr, New York, Second District.
Valuation, Charles E. Elmquist, Minnesota.
Capitalization and intercorporate relations, Alonzo R. Weed, Massachusetts Board of Gas and Electric Light Commissioners.
State and federal legislation, Joseph L. Bristow, Kansas.
Publication of commissions' decisions, Ledyard P. Hale, Counsel, New York, Second District.
Special committee—Public ownership and operation, E. O. Edgerton, California.

On Wednesday evening, October 17, the members of the convention will attend a banquet at the New Willard Hotel.

In the call for the convention the association's officers emphasize the importance of the meeting as follows: "The time calls imperatively for united, patriotic action by all men charged with public responsibility. At this convention the present vital problems of public utility regulation, including the public utilities' function in serving the nation's need, the requests of railroads and other public utilities for increases in rates and for authority to diminish or discontinue service, and the requests of the public for reasonable rates and more adequate service, will be fully discussed with a view to uniform, constructive action by the various state and federal regulatory commissions."

The Traveling Engineers' Association

The executive committee of the Traveling Engineers' Association has decided that, owing to war conditions, the association will not hold its annual convention this year. The executive committee, however, will meet and will issue an annual report containing all information as to what has happened during the year.

The committee reports and papers will be printed and new subjects will be sent out and committees appointed for next year's business.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention to have been held October 22-24, 1917, San Francisco, Cal., indefinitely postponed.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, October 16-17, St. Louis.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 16-18, 1917, St. Paul, Minn.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—W. L. Connelly, Supt. of Telegraph, Indiana Harbor Belt, Gibson, Ind. Next annual meeting to have been held September 18, 1917, Washington, D. C., indefinitely postponed.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. R. McMunn, New York Central, Albany, N. Y. Next convention, September, 1917, St. Louis.

CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 568 Union Arcade Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

GENERAL SUPERINTENDENT'S ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INVESTMENT BANKERS' ASSOCIATION OF AMERICA.—Frederick R. Fenton, 11 W. Monroe St., Chicago. Annual convention, October 1-3, 1917, Baltimore, Md.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex. Next convention, October 16-18, 1917, Cleveland, Ohio.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next annual meeting, September 11, Chicago.

NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.—Jas. B. Walker, 120 Broadway, New York City. Next annual convention, October 16, 1917, Washington, D. C.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PACIFIC RAILWAY CLUB.—W. S. Wollner, Assistant to Chief Engineer, Northwestern Pacific R. R., San Francisco, Cal.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial-Annex Hotel, Pittsburgh.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, office of the president's assistant, Seaboard Air Line, Norfolk, Va. Next meeting, October 2-4, 1917, St. Louis, Mo.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, Assistant Engineer, C. & O., Richmond, Va. Next convention, October, 1917, Duluth, Minn.

RAILWAY SIGNAL ASSOCIATION.— C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next annual convention, September, 1917, Atlantic City, N. J.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W., Sterling, Ill. Next annual convention, September 18-21, 1917, Hotel Auditorium, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Ag't, Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa., Meetings bi-monthly, Pittsburgh.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, Ohio. Next convention, September, 1917, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

Traffic News

The Public Utilities Commission of Maine has suspended until September 1 proposed increases in passenger fares filed by the Maine Central.

All of the principal railroads in Missouri have filed application with the State Public Service Commission for authority to increase freight rates on coal and coke 15 cents a ton.

Reports from Frankfort, Ky., August 3, tell of further suits by coal companies in the Federal courts against the Chesapeake & Ohio, alleging damages by reason of the railroad's failure to furnish cars for coal. In these suits the aggregate amount of damages claimed is about $800,000.

The Kansas Public Utilities Commission has authorized the Missouri Pacific to discontinue 14 passenger trains in that state principally on branch lines, substituting therefore mixed train service. This action is in accordance with the general plan outlined by the Council of National Defense.

William P. Kappes, receiver of the Evansville & Indianapolis, announces that on the recommendation of the Council of National Defense he has discontinued the operation of two daily passenger trains making a reduction of 160 passenger train miles a day, or approximately 5,000 miles a month.

Representatives of the various railroads in Nebraska met in Omaha and organized the Omaha branch of the Railroad War Board Department of Information. The board will conduct a campaign to induce western shippers to load all cars to maximum capacity, to load and unload cars quickly, and to conserve freight cars in every possible manner.

The Public Service Commission of Massachusetts has ordered a general reduction in the rates for the transportation of milk by passenger train or special train, the new rates being based, it is said, on the standard which has been established by the Interstate Commerce Commission for the interstate transportation of milk to Boston. Rates for carloads are made 12½ per cent less than the standard tariff and shipments by freight train 25 per cent less.

The railway war board has announced a curtailment of passenger service that will doubtless surprise the traveling public inasmuch as probably not one passenger out of ten has been at all inconvenienced. The elimination of passenger service will make available for other purposes over one million tons of coal, which will provide three billion ton miles. It is remarkable that this change has been brought about without noticeable criticism. —*American Express Co.'s Bulletin.*

Domestic Travel by rail and inland waterways for both commercial and tourist purposes is assuming normal summer proportions. The feeling of uncertainty on account of war conditions seems to have disappeared. Tourist traffic to the National Parks and other pleasure grounds both East and West is reported off about 25 per cent as compared with the summer of 1916. Alaska tourist traffic is off about 50 per cent. Commercial travel shows an increase, and the large movement of United States troops has helped to place the total volume of railway passenger traffic well beyond the figures for the corresponding summer period of 1916.—*American Express Co.'s Bulletin.*

A meeting of shippers and railroad officers was held at the assembly room of the Atlanta (Ga.) Chamber of Commerce on August 3, to consider ways and means for the most economical use and utilization of the freight car supply. Hon. C. Murphey Candler, chairman of the Railroad Commission of Georgia, presided, and the following signed the call for the meeting: Harry T. Moore, secretary of the Atlanta Freight Bureau, and chairman of the Atlanta regional committee of the National Industrial Traffic League; Ivan E. Allen, president of the Atlanta Chamber of Commerce; H. G. Hastings, president of the Georgia Chamber of Commerce; and E. G. Hitt, general secretary of the Atlanta district sub-committee of the Commission on Car Service.

Appeal by the Illinois Central

Under the caption "Many Are Doing Their Bit, Are You?" the Illinois Central has issued a poster, printed in red and blue on a white background, bearing the following:

HELP YOUR COUNTRY.

Eliminate car-destroying trade units.
Load cars to full capacity.
Persuade your men to co-operate.

When practicable, load two carloads in one car.
Insist on prompt loading and unloading.
No cars to be used as warehouses.

Take no orders less than full carload.
Have billing furnished early.
Eliminate reconsigning; bill to unloading point.

Where absolutely necessary to reconsign, do it while car is in motion.
A car-day lost is economic waste.
Remember, efficient transportation service is vital to our army and navy.

Twenty Thousand Tons of Tobacco

In the present stress it may come about that water transportation is profitable, on occasion, even if the cost is greater than it would be, normally, by railroad. According to a Louisville (Ky.) paper James M. Buckner, of that city, who sold 40,000,000 pounds of tobacco to the French government, was faced with a disastrous loss, being unable to get cars for shipping the tobacco to the sailing port, New Orleans; but he finally secured several river packets and delivered the tobacco at the Gulf. But then he was unable to hire or charter a vessel to carry it to France. He asked the French Commissioner what his government would pay for transporting the tobacco, which is sold in that country, at huge profits, by the government. The commissioner agreed to pay $5.10 per 100 lb. Mr. Buckner then procured $300,000 with which to buy three sailing vessels. One of these vessels has departed for France with tobacco, and another will leave shortly. The third will contain a cargo of cotton.

Mr. Buckner manifested his disappointment at not getting cars by taking photographs while the hogsheads of tobacco were being loaded on packets and mailing a copy to each of a number of railroad presidents. He wrote underneath, "James M. Buckner shipping tobacco by packets because of inability to get freight cars."

N. Y. Central Proposes Increased Fares

The New York Central has filed with the Public Service Commission of New York state new passenger tariffs, making a large number of advances in single trip fares. The commission for the First district (New York City) has suspended the rates for 20 days—from September 1, the date announced by the railroad, to September 20—and has ordered a hearing August 15; while the commission for the Second district announces that the increases cannot be approved so far as they relate to rates west of Albany, because the franchise of the company, granted many years ago, limits local rates on that part of the road to two cents a mile. The new tariffs propose to make these rates 2½ cents a mile, and also propose to advance thousand-mile tickets, which are sold for two cents a mile, to 2¼ cents. Examples of the proposed changes are given below (rates from New York):

	Old rate	Proposed rate
To Albany	$3.10	$3.58
To Utica	5.00	5.93
To Syracuse	6.06	7.25
To Rochester	7.68	9.28
To Buffalo	9.25	10.98
To Yonkers	.30	.38
To Peekskill	.90	1.03
To Poughkeepsie	1.58	1.83
To Mt. Vernon	.30	.35
To White Plains	.50	.58
To Mt. Kisco	.88	.93
To Brewster	1.28	1.30

The Public Service Commission for the Second district has before it applications from most of the electric roads in the state asking for authority to make general increases in fares; and it is understood that in the case of the electric roads, as with the New York Central, broad investigation will be made into the extent of the powers of the commission to authorize deviations from the original franchise requirements.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Uncompressed Cotton to Memphis and St. Louis

City of Memphis et al. v. Chicago, Rock Island & Pacific et al. Opinion by Commissioner Daniels:

Upon rehearing, differentials proposed by defendants in rates on uncompressed cotton from points in Arkansas and Missouri on lines of the St. Louis, Iron Mountain & Southern Railway, St. Louis Southwestern Railway, and St. Louis & San Francisco Railroad to Memphis and St. Louis, respectively, are, with certain exceptions, approved. (45 I. C. C., 487.)

Rates to Mitchell, S. D.

Commercial Club of Mitchell, S. D., et al. v. Ahnapee & Western et al. Opinion by Commissioner Daniels:

Class rates to and from Mitchell, S. D., from and to points east or south of Sioux City, Iowa, and Sioux Falls, S. D., are found unreasonable and prejudicial. Reasonable maximum rates are prescribed for the future, including prportional rates from the upper Mississippi River crossings.

Commodity rates to Mitchell constructed in relation to the corresponding commodity rates to Sioux Falls are recommended.

Fourth section relief is denied. (46 I. C. C., 1.)

COURT NEWS

Proof of Defective Car Door

In a cattle shipper's action for injuries from a door of the car hired, which fell upon him while he and others were attempting to open it, the Missouri Supreme Court holds that the burden was on the shipper to show that the defendant railroad's car door was defective, and that the injury resulted therefrom, the doctrine of res ipsa loquitur not being applicable.—Deister v. Kansas City N. W. (Mo.), 195 S. W., 499. Decided May 29, 1917.

Application of Safety Appliance Act

The Circuit Court of Appeals, Sixth Circuit, holds that under the provision of the Safety Appliance Act, as to the use of air brakes, a number of bad-order cars, fastened together by chains, together with an engine, tender and caboose, constituted a train, even though it would be highly inconvenient to apply the train-brake provision to such cases, and might necessitate limiting the number of chained-up cars hauled to 15 per cent of the cars in the train, the train-brake provision being absolute and mandatory.—Pennsylvania Co. v. United States, 241 Fed., 824. Decided May 8, 1917.

Unused Transit Credit

A milling in transit rate is an entirety, and must be accepted and carried out in its entirety or not at all. The Nebraska Supreme Court holds that a shipper cannot maintain an action in the courts of that state for unused transit credit on shipments of grain made from various points in Nebraska, destined to points outside of Nebraska, and to one point in Nebraska, where parts of each car were forwarded indiscriminately to the points of destination, and where the rules and regulations of the tariff have not been complied with.—Fremont Milling Co. v. Chicago & N. W. (Neb.), 163 N. W., 331. Decided May 19, 1917.

Switching Service

The Minnesota Supreme Court holds that where a Minnesota railroad corporation was required by its franchise to construct and operate a complete railroad system in the state, including switching yards and tracks, and where it acquired a switching road as a part of its system, and the switching company held the

legal title to the property as a mere convenience, the Railroad and Warehouse Commission, even in anticipation of an abandonment, might order the railroad to continue its operation.—Minneapolis C. & C. Assn. v. Great Northern (Minn.), 163 N. W., 294. Decided June 15, 1917.

Anti-Pass Law and Deed to Right of Way

The Kentucky Court of Appeals holds that section 196 of the State Constitution, providing that passenger transportation shall be regulated to prevent unjust discrimination, and section 197, prohibiting free passes, render void as against public policy a railroad's agreement to give free transportation in return for right of way deeded it, especially as the Kentucky Anti-Pass Law of 1916, enacted pursuant to section 196, specifically prohibits transportation except for a money consideration. It is held that the Anti-Pass Law does not impair the obligation of an existing contract by a railroad to furnish passenger transportation in return for right of way deeded it, since the contract was made in view of section 196, and because the Anti-Pass Law is merely a police regulation within the legislature's constitutional powers. The court in its opinion reviewed the prior Anti-Pass Law decisions.—Kentucky Traction & Terminal Company v. Murray (Ky.), 195 S. W., 1,119. Decided June 22, 1917.

Passengers Leaving Seats Before Train Stops

When the name of the next station is called two or three times by the conductor while the train is slackening for the station, the conductor does not request or invite a passenger to get up and go to the door while the train is moving; his language amounts merely to an emphatic announcement of the near approach to the station, and is a notice to passengers who desire to disembark there that the train is so approaching. A woman 40 years old, weighing 172 lb., having children with her, left her seat in a car when the conductor announced the approach to a station and stood by the door. The Arkansas Supreme Court holds that her acts should be viewed in the light of all the surrounding circumstances, and if under them her act was that of an imprudent person, she could not recover for an injury received by her in a fall, although it was the result of an unusual movement of the train.—Lashlee v. Bush (Ark.), 195 S. W., 375. Decided May 21, 1917.

Change in Location of Station

A railroad is a quasi public highway, and, at least to the extent permitted by statute, the company may change the location of its tracks and stations. A legislative enactment being the supreme declaration of the public policy of the jurisdiction, the Kentucky Court of Appeals holds that when, under the provisions of a statute, the Railroad Commission has consented to and authorized a change of location of a station, it has but carried out the expressed public policy of the legislature upon the subject, which public policy is paramount to all inconvenience which may follow from an execution of the statutory provisions.—Beatty v. L. & N. (Ky.), 195 S. W., 487. Decided June 5, 1917.

The Texas Court of Civil Appeals holds that a judgment restraining a railroad company from removing a station from a tract of land in violation of a covenant in the deed under which it obtained title to the land will not prevent the removal of the building in obedience to an order of the Railroad Commission when the public benefit requires such removal and the Railroad Commission orders it.—San Antonio & A. P. v. Mosel (Tex.), 195 S. W., 621. Decided June 6, 1917.

Condemnation—Public Necessity

While the decisions of the courts of other jurisdictions are not uniform upon the subject, the California District Court of Appeal holds, in condemnation proceedings by a railroad, that the law in that state seems to be settled in favor of the view that, when the legislature has declared that railroad corporations shall have the right to condemn lands of private persons for their uses, the question whether there is a present public need for the construction and operation of the particular railroad seeking to exercise that right is no longer a judicial question to be litigated in the condemnation proceedings, except to the extent that a private person whose lands are sought to be taken may put in issue the good faith of the railroad corporation in seeking to acquire his land for uses which are not public, but really to subserve some private interest or end.—Castro Point Ry. & Terminal Co. v. Anglo-Pacific Development Co. (Cal.), 165 Pac., 544. Decided June 14, 1917.

Contributory Negligence of Passenger Crossing Tracks

A passenger attempted to cross the tracks near a station about midnight in front of an approaching freight train that he supposed was a passenger train, which would slacken speed at the station and give him time to cross. He tripped over a spike projecting about 3 inches from a tie and was run over by the train. The Texas Court of Civil Appeals holds that he was guilty of contributory negligence as a matter of law, and could not recover from the railroad.—Schaff v. Combs (Tex.), 194 S. W., 1,159. Decided May 3, 1917.

Inspection of Cars

The Texas Court of Civil Appeals holds that the ultimate carrier of a car, although it made no inspection, was not liable for injuries to a consignee's servant, who, while unloading a carload of automobiles, loaded by the consignor in a foreign car, was injured by a loose casting falling from over the door on the inside of the car, the defect being one not discoverable from the outside of the car. The duty of such a carrier on receiving a car is held to extend only to a reasonable inspection of its condition with reference to its fitness for transportation.—Kansas City, M. & O. v. Pysher (Tex.), 195 S. W., 981. Decided June 7, 1917.

Interstate Shipments

Bills of lading of shipments from Argenta, a point in Illinois, to New York, contained a notation to stop at Chicago for weight and inspection. The Illinois Supreme Court holds that, in the absence of evidence to sustain the consignee's contention that they were billed to New York merely to obtain a reduction in the freight rate, and were not intended to go beyond Chicago, they were interstate shipments.—Shellabarger Elevator Co. v. Illinois Central (Ill.), 116 N. E., 170.

Merchandise was shipped from Oklahoma to Ft. Worth, Texas, transportation to be continued to some other point in Texas thereafter to be determined. There was no delivery at Ft. Worth, but delivery was made at the ultimate destination, Abilene. The goods, however, remained some time in Ft. Worth, and were shipped on a new bill of lading to Abilene. Action was brought by the shipper against the railroad company to recover the penalties provided by the Texas statute for refusal to deliver freight upon the payment or tender of the freight charges, as shown by the bill of lading, the railroad having refused delivery except on payment of an additional sum. The Texas Court of Civil Appeals holds that the shipments from Ft. Worth to Abilene was an interstate shipment, and as the state statute does not apply to such shipments, no recovery could be had.—G. C. & S. F. v. Mathis (Tex.), 194 S. W., 1,134. Decided March 29, 1917.

Recovery by Initial Carrier from Connecting Carrier

In an action by the initial carrier against the terminal carrier for reimbursement for damage to an interstate shipment, the Iowa Supreme Court holds that the Carmack amendment, making initial carriers liable for loss to interstate shipments, and allowing recovery from the connecting carrier, makes the initial carrier's recovery dependent on a showing of injury to the shipment while in the connecting carrier's possession, and not upon the shippers' judgment against the initial carrier, although sum recovered bythe shipper is conclusive as to the amount of damage, thus making the initial carrier the representative of all connecting carriers. In such an action the record of proceedings and judgment in the shipper's action are admissible, in view of the provision of the statute making the judgment proper evidence, and the record being necessary to show the scope of the adjudication. Although the statute does not require notice of the shipper's suit, to be given connecting carriers, the giving of such notice is proper practice. A reason for this is that

ordinarily, if a third person, having notice of an action against the defendant in which he is liable to the defendant, ignores such notice, he will be held to indemnify the defendant to the extent of the judgment rendered against the latter on the ground of estoppel, the purpose of the rule being to avoid a multiplicity of suits.—St. Joseph & G. I. v. Des Moines Union (Iowa), 162 N. W., 812. Decided May 16, 1917.

Construction of Grant of Right of Way

An instrument granted a right of way across certain lands, reserving the use of all of such lands except that portion actually used and occupied by the railroad. The company laid a single track, but cut grass and willows on the entire statutory width, used substantially all the ground within such width for erecting telegraph poles and storing materials, and for 32 years returned it for taxation and paid taxes thereon, while the grantor never availed himself of the right to use even those portions not occupied by the company. In a suit by the successor of the grantor against the railroad to establish title to the right of way and to enjoin the railroad from laying a track, in addition to its main track, on the strip of ground, the Circuit Court of Appeals, Eighth Circuit, held that the grant was of a right of way 100 ft. wide, the maximum width allowed by statute, and not merely a strip sufficient in width for a single track; the provision as to the right to use parts not occupied by the company constituting a reservation and not an exception. An "exception" is a withdrawal from the effect of a grant some part of the thing granted which is in existence and included under the terms of the grant; while a "reservation" is something arising out of the thing granted not then in existence, or some new thing created or reserved, issuing out of the thing granted and not a part of the thing itself. The reservation in the grant in this case would not extend beyond the grantor's own lifetime, in the absence of words of limitation and inheritance.—Iowa Ry. & Light Co. v. C. M. & St. P., 241 Fed., 581.

Delegation of Power to Fix Rates

In 1905 the Missouri legislature passed an act establishing maximum intrastate rates, and in 1907 another establishing maximum passenger rates. In 1913 it passed the Public Service Commission Act, section 47, of which conferred upon the commission the power and duty of establishing reasonable maximum intrastate rates. The next year fourteen railroads applied for a revision upwards of freight and passenger rates, and following an investigation were granted certain modified measures of relief by the commission, to take effect January 1, 1916. A citizen brought the case into the County Circuit Court for review. That court reversed the finding of the commission, and the case was appealed to the state Supreme Court. The two questions involved are purely questions of law, namely, (a) Does section 47 of the Public Service Commission Act confer authority upon the commission to raise railroad rates above the maximum fixed by the legislature unless prohibited by the Constitution? (b) If the section has this effect, is it invalid because in violation of section 14, art. 12 of the State Constitution? The Supreme Court answered the first question in the affirmative. Section 14, art. 12, provides that the legislature shall from time to time pass laws establishing reasonable maximum rates of charges for the transportation of passengers and freight. The court mentioned seven states which have constitutions containing a provision wholly or substantially similar to that of Missouri, viz., Illinois, West Vrginia, Nebraska, Washington, Alabama and Georgia; and cited cases from these states recognizing the authority of the legislatures to delegate to public service commissions the right to ascertain and determine reasonable rates. The court said that by section 47 of the Missouri Public Service Commission Act the legislature did not delegate to the commission the absolute power of fixing maximum rates, but only the power to ascertain and determine what rates are reasonable; and provided by other sections of the act for a judicial review of the fact of reasonableness, which is only prima facie, and while the commission may order the observance of these rates so found by it to be reasonable, under penalties for violation fixed by the legislature, such observance endures subject to a review by the courts. The judgment of the Circuit Court was reversed, with directions to affirm the order of the commission.—State ex rel. Rhodes v. Public Service Commission (Mo.). Decided April 9, 1917

Equipment and Supplies

LOCOMOTIVES

THE MAINE CENTRAL is getting prices on 10 locomotives.

THE MORGANTOWN & KINGWOOD has ordered one Consolidation locomotive from the Baldwin Locomotive Works.

THE CENTRAL RAILWAY OF BRAZIL has ordered two Consolidation locomotives from the Baldwin Locomotive Works.

PANAMA CANAL LOCOMOTIVES SOLD.—Over 100 of the locomotives used in the construction of the Panama Canal have been disposed of by Governor Harding, of the Canal Zone, according to reports to Secretary of War Baker. Ten locomotives have been transferred to the Alaska engineering commission; two were sold to the Chile Exploration Company, and 95 were sold to the A. B. Shaw Company, which does a contracting business in New York.

FREIGHT CARS

THE DONNER STEEL COMPANY is inquiring for prices on 25 gondola cars.

THE RUSSIAN GOVERNMENT is about to place orders for an additional 10,000 1,200 pood (43,200 lb.) capacity four-wheel box cars. This is the second lot of 10,000 cars on this order on which 40,000 cars have been authorized. It is understood that Canadian car builders may receive this lot.

COPENHAGEN'S NEW UNDERGROUND RAILWAY.—As the result of the difficulty in getting the materials for rails, telegraphs and signals, it has been found impossible to complete a proposed new underground railway in Copenhagen.

EARNINGS OF SWISS RAILWAYS.—The earnings of the Swiss Federal railways for the past three years have been: In 1914, $9,264,000; in 1915, $10,808,000; in 1916, $11,580,000. These profits, however, have been absorbed in amortization and betterments.

WAR TIME TRANSPORTATION.—One of the hardest things for a soldier to relish is railroad travel in war time. When a few men are moved at a time sleeping cars can be provided, but when an army must be moved in a hurry then day coaches and even freight cars come into play. During our late Mexican trouble there was considerable grumbling because our soldiers lacked Pullmans to travel in, and it is said that when German soldiers heard of this they quit fighting a whole day in order to give vent to their merriment. They are glad to travel in box cars with a little straw in the bottom. Our soldier boys "Somewhere in France" have perhaps had a taste of traveling in cars marked "Eight Horses or Forty Men," where they draw lots in order to see who lies down and who sleeps standing up. But the American boys are not the ones to kick at a hardship they know cannot be avoided.—*Wall Street Journal.*

RAILWAY DEVELOPMENT IN SOUTH RUSSIA.—The British vice-consul at Kherson reports, under date March 13, that the road bed of the railway between Merefa and Kherson is in complete order, and as soon as rails can be obtained they will be laid. This line will be very important for the export of grain and ore from Kherson, and it is expected that the line will be in full working order by the time foreign exports will again be possible. The government has officially confirmed the project for constructing a railway from Saratov to Alexandrovsk. The carrying out of this project will enable goods from the Saratov district to reach the port of Kherson via the River Dnieper, and vice versa, thus considerably increasing the volume of exports and imports at Kherson. Progress is being made with the construction of the railway between Kherson and Djankoi, which will join Kherson with the Crimea-Kertch line. The government has sanctioned the building of a bridge over the Dnieper, which will be sufficiently high not to impede river traffic; the building of the bridge will be begun this year.

Supply Trade News

On August 1 the Kewanee plant of the National Tube Company, located at Kewanee, Ill., was sold to the Walworth Manufacturing Company, Boston, Mass., and on that date the National Tube Company retired from the fittings business.

The Acar Manufacturing Company, 30 Church street, New York, manufacturers of the Blue Signal Safety Device, announces the appointment of Leland T. Johnson as special representative, with headquarters at the Hotel Sherman, Chicago, and Burt E. Dana, New York salesman, with headquarters at 30 Church street, New York.

F. A. Molitor, consulting engineer, 35 Nassau street, New York, and major in the Engineer Officers' Reserve Corps, has recently been ordered from the Engineers' Training Camp to duty in Washington on the staff of S. M. Felton, the director-general of railways. This office is an adjunct of the chief of engineers, U. S. A., and has to do with the military railway and transportation problems in France.

The American Steel Export Company announces the appointment of Walter R. Morris as assistant traffic manager, with headquarters in the Woolworth building, New York City. Because of suspended service for an indefinite period of American-Hawaiian steamers via Panama Canal, Mr. Morris resigned his position as assistant traffic manager of the American-Hawaiian Steamship Company, to accept employment with the American Steel Export Company. Prior to his connection with the Panama Canal Line in 1910, then known as the Tehauntepec Route, Mr. Morris was for a great many years associated with the Southern Pacific and Pacific Mail companies in their traffic departments at both San Francisco and New York.

Railway Equipment Forms Large Share of Year's Billion Dollar Steel Exports

Exports of iron and steel and manufactures in the fiscal year ending June 30, 1917, were four times as great in value as in the fiscal year 1914. According to a compilation by the National City Bank of New York, in the fiscal year 1915 exports of iron and steel manufactures reached $226,000,000, against $251,000,000 in 1914. They were worth $621,000,000 in 1916, and approximately $1,120,000,000 in 1917, these being official figures for 11 months and an estimate for the closing month of the year.

Most of this increase in exportation in 1916 and 1917 went to Europe. The total value of iron and steel manufactures exported to Europe in the fiscal year 1915 was but $92,000,000, in 1916, $354,000,000 and in 1917 approximately $700,000,000.

The following table shows the total exports of iron and steel and manufactures in the last four years, and also the exports of some of the important classes of railway material. The total for June, 1917, is estimated:

Total Iron and Steel and Manufactures

Year	Value
1917	$1,117,831,000
1916	621,209,000
1915	225,861,000
1914	251,480,000

Locomotives

Year	Number	Value
1917	1,290	$16,037,000
1916	799	12,665,000
1915	228	2,115,000
1914	383	3,692,000

Steel Rails

Year	Tons	Value
1917	611,000	$26,632,000
1916	540,000	17,687,000
1915	159,000	4,537,000
1914	338,000	10,250,000

Railway Track Material

Year	Value
1917	$8,164,000
1916	5,261,000
1915	2,407,000
1914	2,534,000

Railway cars are not separately divided in the National City Bank's compilation.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is preparing preliminary plans for the construction of a two-story brick head-house, 36 by 70 ft., and a frame freight-house, 36 by 200 ft., at Newton, Kan.

The company is also contemplating the construction of a freight transfer station at Kansas City, Kan. The plans at present provide for a frame structure, 30 by 1,000 ft., with about 400 ft. of platform. Part of the building will be two stories high, and will be used to house the office force.

CANADIAN PACIFIC.—This company will build a three-span reinforced concrete bridge at London street, Windsor, Ont. It will consist of three 35-ft. spans, with reinforced concrete abutments, piers and dock.

CHESAPEAKE & OHIO.—The Chesapeake & Ohio Northern was opened for traffic on July 30, from the main line of the Chesapeake & Ohio at Edgington, Ky., north to Waverly, Ohio, 30 miles. The work included the construction of a steel bridge 3,450 ft. long over the Ohio river at Sciotoville; also a steel viaduct 1,080 ft. long over the Little Sciotoville river, two miles north of Sciotoville. A description of this line was published in the *Railway Age Gazette* March 3, 1916, page 397.

CHESAPEAKE & OHIO NORTHERN.—See Chesapeake & Ohio.

GULF & EAST TEXAS.—Incorporated in Texas with general offices at Hicks to build a railroad from Hicks to Wursbaugh, about 10 miles. The incorporators include E. R. Campbell and A. E. Ammerman, Houston; S. B. Hicks, J. T. Wursbaugh, M. F. Johnson and T. H. Scovill, Shreveport, La.

KANSAS CITY TERMINAL.—This company is drawing preliminary plans for the construction of two passenger stations at Kansas City, Kan. Details of the plans are not available at present, but the estimated cost of each station, with its approaches and platforms, will be approximately $100,000. Construction is expected to be started this summer so that stations will be ready for service next spring.

MAHONING & SHENANGO (ELECTRIC).—This company, in conjunction with Lawrence county, Pa., is planning the construction of a bridge over Neshahannock Creek at New Castle, Pa. The estimated cost of the structure is about $66,000, but construction is not expected to start immediately.

MUSCLE SHOALS TRACTION.—A contract has been given by this company to the Central Construction Company, Indianapolis, Ind., to build a 64-mile interurban line. The projected route is from a connection with the Louisville & Nashville and the Southern Railway, at Florence, Ala., east via St. Florian, Bailey Springs, Killen, Center Star, Rogersville and Athens to Huntsville, where connection is to be again made with the Southern Railway and with the Nashville, Chattanooga & St. Louis. A branch line is also to be built north to Lexington, 12 miles. S. L. Whitten, president; T. W. Pratt, vice-president and treasurer; T. H. Allen, secretary and general manager, Florence, Ala.; E. M. Wilkins, chief engineer; and M. S. Bingham, consulting engineer.

PENNSYLVANIA-DETROIT.—A contract has been awarded by this company to Iliff Brothers, London, Ohio, for the construction of a bridge over the Huron river at a point two miles above Flat Rock, Mich. The bridge will be of reinforced concrete, and will have three 14-ft. spans.

PENNSYLVANIA LINES WEST.—A contract has been awarded by this company to P. T. Clifford & Son, Valparaiso, Ind., for the construction of a third track between Trimmer Junction, Ind., and Boone, 6.4 miles. The work will involve a change in grade extending over a distance of two miles and the building of six small bridges. The work has already been started, and will cost approximately $625,000.

SALT LAKE, GARFIELD & WESTERN.—This company has completed plans for the electrification of its line and work on the project has already been started. The approximate cost of the work will be $250,000.

Railway Financial News

BUFFALO, ROCHESTER & PITTSBURGH.—This company has applied to the New York State Public Service Commission, Second district, for approval of equipment agreement, series J, with the Guaranty Trust Company, of New York, as trustee dated July 1, 1917, and for permission to issue $1,000,000 five per cent, series J equipment bonds, pursuant to said agreement, at not less than 90 per cent of their par value, and interest.

CHICAGO, BURLINGTON & QUINCY.—The Illinois State Public Utilities Commission has authorized this company to issue $25,455,000 of general mortgage bonds at four per cent, payable March 1, 1958.

CHICAGO, ROCK ISLAND & PACIFIC.—Permission has been given by the Illinois State Public Utilities Commission to issue $12,500,000 of general mortgage gold bonds at four per cent.

Clarence H. Venner, of New York City, has filed in the Sangamon County Circuit Court of Illinois an appeal from a decision of the Illinois State Public Utilities Committee authorizing the issuance of $65,000,000 in preferred stocks at six and seven per cent by the above company. Mr. Venner, who is a stockholder, contended that the company should not issue preferred stocks in such large amounts, and objected to the plans for reorganizing the company. The appeal will be heard at the September term of court.

ST. LOUIS & HANNIBAL.—Charles W. Cox and C. Ledyard Blair, of New York, have filed a plan for the reorganization of this company with the Missouri Public Service Commission. The company operates between Hannibal, Mo., and Perry, a distance of 104 miles. The plan of reorganization provides for a new company, the waiving of all old claims, assumption of the floating debt, a new issue of preferred stock of $250,000, and the issue of $370,000 of new common stock.

SALINA NORTHERN.—This road, operating 81 miles between Salina, Kan., and Osborne, has been sold at auction to P. W. Goebel, president of the Commercial National Bank of Kansas City, Kan., for $693,000.

WAUPACA-GREEN BAY.—This 10-mile line, extending from Waupaca, Wis., to Green Bay, has gone into the hands of a receiver because the interest due on $75,000 was not paid in June. Frank B. Seymour, general manager of the Green Bay & Western, has been named receiver. The Wisconsin State Railroad Commission, in its 1916 report, valued the productive cost of the Waupaca-Green Bay, less depreciation, at $95,777. The total indebtedness is now $86,000. The company has until September 1 to liquidate its indebtedness or be sold under receivership.

BUDGET OF SOUTH AFRICAN RAILWAYS.—The estimates of the expenditures of the main services of the South African railways during the year ended March 31, 1918, are given at $50,815,000, and the revenues at $66,927,000. The expenditures of the subsidiary services are estimated at $2,431,000, and the revenues at $2,361,000. In the main services the revenue from freight and minerals other than coal is estimated at $29,177,000; from coal, $15,574,000; from live stock, $2,372,000, and from the passenger service, $16,310,000.—*Commerce Report.*

NEW LAW OF RAILWAY CONCESSIONS IN VENEZUELA.—The new law of railway concessions passed the Venezuelan congress, and was signed by the provisional president June 12. The principal difference between this law and the former one is that the provision by which all railways constructed under concessions became the property of the government after a specified term of years is changed, and railways to be built under the new law will be fully and perpetually the property of the parties constructing them except that such ownership may not be transferred in whole or in part to any foreign government. It is hoped that under the more liberal terms of this new law foreign capital may undertake the construction of railways, which the country so badly needs for its internal development.—*Commerce Report.*

Railway Officers

Executive, Financial, Legal and Accounting

John G. Walsh has been appointed assistant to vice-president of the Erie, with headquarters at New York.

W. A. Corkill has been elected treasurer of the Carolina & North Western, with office at Chester, S. C., vice F. Wolfe, resigned.

Dameron Black has been appointed auditor of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga., vice R. K. Slaughter.

G. F. Moore has been appointed assistant to the president of the Pittsburgh & West Virginia, with office at Pittsburgh, Pa., vice G. G. Early.

Operating

E. A. O'Donnell has been appointed assistant superintendent of the El Paso division of the Galveston, Harrisburg & San Antonio.

M. H. McEniry has been appointed assistant trainmaster of the Delaware & Hudson, with office at Carbondale, Pa., vice A. T. Cushing, resigned.

D. C. Smith has been appointed manager for the receivers of the Georgia Coast & Piedmont, with headquarters at Brunswick, Ga., vice A. do Sola Mendes.

H. M. Gargan, assistant trainmaster of the Delaware & Hudson at Oneonta, N. Y., has been appointed trainmaster on the Susquehanna division, vice M. W. Sullivan, promoted.

Clarence R. Smith, trainmaster on the Illinois Central, at Fordham, Ill., has been appointed trainmaster of freight service, with the same headquarters, succeeding A. M. Umshler, promoted. Thomas Whitby has been appointed trainmaster at Fordham, succeeding C. R. Smith.

George F. Dickson, superintendent of the Georgia & Florida, with office at Douglas, Ga., has been appointed superintendent also of the Augusta Southern, succeeding J. A. White, resigned to accept an appointment as military transportation officer, Camp Wadsworth, Spartanburg, S. C.

S. A. Stockard, superintendent of car service of the Atlantic Coast Line, at Wilmington, N. C., has been appointed assistant general superintendent of transportation, with office at Wilmington, and his former position has been abolished; E. M. Dewey has been appointed car accountant, with office at Wilmington.

A. E. Boughner, superintendent of the St. Louis district of the Missouri, Kansas & Texas, at Sedalia, Mo., has been appointed superintendent of terminals at St. Louis; J. F. Hickey, superintendent at Muskogee, Okla., has been transferred to Sedalia; W. M. Whittenton has been appointed superintendent of the McAlester district, with headquarters at Muskogee, Okla., succeeding Mr. Hickey.

Richard E. Casey, who has been appointed superintendent of the Grand Rapids & Indiana, with headquarters at Grand Rapids, Mich., was born at Union City, Ind., on October 6, 1868. He entered railway service with the Grand Rapids & Indiana on November 12, 1888, as a telegraph operator. Two years later he was promoted to ticket agent at Kalamazoo, Mich., and in April, 1893, became traveling passenger agent, with headquarters at Grand Rapids. In December, 1897, he was appointed trainmaster at Ft. Wayne, Ind., which position he held until his recent appointment as superintendent of the Northern division.

A. E. Brown, trainmaster of the Sacramento division of the Southern Pacific at Sacramento, Cal., has been appointed assistant superintendent of the Tucson division, succeeding T. H. Kruttschnitt, resigned to enter military service; C. F. Donnatin, trainmaster of the Los Angeles division at Los Angeles, has been appointed assistant superintendent of that division, with the same headquarters; F. J. Berry, trainmaster at Truckee, has been transferred to the Sacramento division, with headquarters

at Sacramento; C. A. Collins succeeds Mr. Berry as trainmaster at Truckee; J. C. Muir, trainmaster at Bakersfield, has been transferred to the Los Angeles division, with headquarters at Los Angeles.

Edward F. Blomeyer, whose appointment as general manager, in charge of the operating and traffic departments, of the Ann Arbor and the Manistique & Lake Superior, was announced in the *Railway Age Gazette* on June 29, was born at Farmington, Mo. He entered railway service with the St. Louis, Iron Mountain & Southern as a telegraph operator, and later served successively as agent and train despatcher. He afterward became auditor of the Southern Missouri & Arkansas, following which he was promoted to freight and passenger agent. Several years later he was promoted to vice-president and general manager of the St. Louis, Memphis & Southeastern, which position he held until he became president and general manager of the Pere Marquette Steamship Company, and the Manistique, Marquette & Northern. Following this he was for several years vice-president and general manager of the Tennessee, Alabama & Georgia, and for a short time was vice-president and traffic manager of the San Antonio, Uvalde & Gulf, which position he held until his appointment as general manager of the Ann Arbor and the Manistique & Lake Superior.

Traffic

Dexter M. Denison, general freight agent of the Minneapolis & St. Louis, has been appointed freight traffic manager, with headquarters at Minneapolis, Minn., effective August 1. He was born at Hamlet, N. Y., on July 24, 1866, and entered railway service in July, 1882, as a night telegraph operator, with the Minneapolis & St. Louis. He was later promoted to local freight agent, and served in this capacity at various stations until his appointment as traveling freight agent. He next became commercial agent at Minneapolis, following which he served successively as assistant general freight agent and general freight agent, with headquarters at Minneapolis. On August 1, 1917, he was promoted to freight traffic manager, succeeding F. C. Townsend, who has been promoted to vice-president in charge of traffic.

D. M. Denison

Wallace Smith has been appointed commercial agent of the Ocilla Southern, with office at Ocilla, Ga.

R. L. Butt has been appointed general freight agent of the Carolina & North Western, with office at Atlanta, Ga.

E. B. Leavitt has been appointed industrial agent of the Southern Pacific, with headquarters at San Francisco, Cal.

A. W. Sanders, assistant general freight agent of the Carolina, Clinchfield & Ohio, at Johnson City, Tenn., has resigned, and his former position has been abolished.

G. G. Early, assistant to president of the Pittsburgh & West Virginia at Pittsburgh, Pa., has been appointed general freight and passenger agent, with office at Pittsburgh, vice S. P. Woodside.

J. W. Hunter, general freight agent of the Southern Railway at Atlanta, Ga., has been appointed general freight agent, with office at Charlotte, N. C., succeeding Walter Shipley, who has entered the service of the American Railway Association.

I. K. Dye, traffic manager of the Coal & Coke Railway at Elkins, W. Va., having resigned to engage in other business, W. Trapnell, superintendent, is now in charge of the traffic and industrial development department, with office at Elkins, W. Va., and W. E. Leith has been appointed acting general freight and passenger agent, with office at Elkins.

B. F. Moffatt, assistant general freight agent of the Minneapolis & St. Louis, has been appointed assistant freight traffic manager, with headquarters at Minneapolis, Minn.; W. M. Hardin, assistant general freight agent, has been promoted to general freight agent, and C. A. Werlich, chief of the tariff bureau, has been appointed assistant general freight agent, with headquarters at Minneapolis, effective August 1.

A. B. Cutts, general passenger agent of the Minneapolis & St. Louis, has been appointed passenger traffic manager, with headquarters at Minneapolis, Minn. He was born at Lillington, N. C., on October 23, 1866, and entered railway service with the Chicago & Alton on December 1, 1884. In 1887 he became chief ticket clerk for the Chicago, St. Paul, Minneapolis & Omaha, and from 1890 to 1892 he was chief rate clerk for the Great Northern. On the latter date he became chief rate clerk to the general passenger agent of the Minneapolis & St. Louis, and in August, 1894, was promoted to general passenger agent, which position he held until his appointment as passenger traffic manager, as above noted.

Engineering and Rolling Stock

A. G. Nutting has been appointed supervisor of signals on the Northern Pacific, with headquarters at Livingston, Mont., succeeding E. A. Allen, resigned, effective August 1.

W. C. Hawkins has been appointed engineer maintenance of way of the Coal & Coke Railway, with office at Gassaway, W. Va., vice F. D. Cosner, resigned to engage in other business.

A. D. Williams, master mechanic on the Southern Pacific at Stockton, Cal., has been appointed superintendent of motive power of the Northern district, with headquarters at Sacramento, succeeding D. P. Kellogg, resigned to accept service with another company.

J. H. Barber, resident engineer of the Canadian Pacific at West Toronto, Ont., has been appointed engineer in charge of double tracking, North Toronto, and H. R. H. Silcox has been appointed resident engineer, Toronto Terminals, in place of Mr. Barber, both appointments being only temporary.

W. M. Post, inspector of signals on the Pennsylvania, at Philadelphia, Pa., has been appointed assistant signal engineer, with the same headquarters, succeeding C. C. Anthony, resigned. W. N. Spangler, inspector of signals at Philadelphia, succeeds Mr. Post. E. L. Watson, supervisor of signals at Philadelphia, has been appointed inspector of signals, succeeding W. N. Spangler. Guy Toft, acting supervisor of signals of the Pittsburgh division, has been appointed supervisor of signals of the same division. H. N. Stump, acting supervisor of signals of the Williamsport division, has been appointed supervisor of signals of that division. E. G. Bauman, acting supervisor of signals of the Allegheny division, has been appointed supervisor of signals of the Allegheny division.

W. H. Bradley, master mechanic on the Chicago & North Western at Clinton, Ia., has been appointed assistant to the general superintendent of motive power, with headquarters at Chicago, Ill., succeeding E. C. Hall; W. E. Dunham, supervisor of motive power and machinery at Winona, Minn., also has been appointed assistant to the general superintendent of motive power, with headquarters at Chicago; J. W. Anderson, master mechanic of the West Iowa division at Boone, Ia., has been appointed supervisor of motive power and machinery at Winona; L. Chapman, division master mechanic at Belle Plaine, Iowa, has been transferred to the West Iowa division, with headquarters at Boone; H. L. Harvey, road foreman of engines on the Wisconsin division, with headquarters at Chicago, has been appointed master mechanic of the Iowa and Minnesota division, with headquarters at Belle Plaine.

Railway Officers in Military Service

W. J. Leahy, general passenger agent of the Chicago, Rock Island & Pacific, at Chicago, who received a commission as major in the Quartermasters' Officers' Reserve Corps, has been released from active service in the army.

John Lawrence Maher, assistant engineer in the office of the district engineer maintenance of way, Northwest district, of the Baltimore & Ohio, has been commissioned a captain in the Officers' Reserve Corps, U. S. A., and is waiting instructions from the adjutant general to report.